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2019 National Survey of Children's Health

Methodology Report

The U.S. Census Bureau reviewed this data product for unauthorized disclosure of confidential information and approved the disclosure avoidance practices applied to this release. CBDRB-FY20-POP001-0166

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Abstract

Objectives

This report details the development, plan, and operation of the 2019 National Survey of Children's Health (NSCH). This survey is designed to provide national and state-level estimates on key indicators of the health and well-being of children, their families and their communities, as well as information about the prevalence and impact of special health care needs. Funding and direction for this survey was provided by the Health Resources and Services Administration's Maternal and Child Health Bureau (HRSA MCHB) within the U.S. Department of Health and Human Services. The U.S. Census Bureau conducted the survey on behalf of HRSA MCHB.

Methods

The 2019 NSCH used a national sample of 184,000 addresses. During data collection, a screener questionnaire was used to identify households with children and roster children in the household. The screener questionnaire also included a battery of questions to identify children with special health care needs. One child was randomly selected from each eligible household, and that child was the subject of a more detailed topical questionnaire. Responses to the screener and topical questionnaires were collected, processed, and published in the Screener Public Use File and Topical Public Use File.

Results

The weighted Overall Response Rate for the 2019 NSCH was 42.4%. A total of 68,500[1] screener questionnaires were completed, and of those 35,760 were eligible for topical questionnaire follow-up. Of those topical-eligible households, 29,433 completed a topical interview. Weighted estimates from the Topical file generalize to state and national resident child populations. Weighted estimates from the Screener file generalize to state and national resident child populations (using the child weight) and households with children by state and nationally (using the household weight).

[1] Rounded to the nearest five hundred in accordance with the U.S. Census Bureau disclosure avoidance practices.

Introduction

The 2019 National Survey of Children's Health (NSCH) was conducted by the U.S. Census Bureau for the Health Resources and Services Administration, Maternal and Child Health Bureau (HRSA MCHB) within the U.S. Department of Health and Human Services (HHS). As stated in the Office of Management and Budget Clearance Package, the purpose of the NSCH is to "collect information on factors related to the well-being of children, including access to and quality of health care, family interactions, parental health, school and after-school experiences, and neighborhood characteristics."[2] This document details the objectives, methodologies, and results of the 2019 NSCH into seven sections.

- *Survey History*. The 2019 NSCH is the fourth annual production following the redesign and merging of the previous NSCH and National Survey of Children with Special Health Care Needs (NS-CSHCN).

- *Frame, Sample and Selected Child Subsample.* A screener questionnaire identified households with children and rostered the children in those households. A topical questionnaire collected detailed information about one child selected at random from the household.

- *Data Collection.* Data were collected using a two-stage paper survey instrument and a single-stage web-based survey instrument. This section discusses the mail schedule and data capture methods for web, paper, and telephone questionnaire assistance operations.

- *Response Analysis.* This section discusses the calculation of response rates along with analyses of survey breakoffs, item nonresponse, and treatment group comparisons.

- *Data Processing.* Web and paper survey responses were cleaned for analysis, including unduplication of responses, edits for data quality, creating standardized and derived variables, and imputation of missing values.

- *Weighting Specifications.* Weights allow for estimates to be generalized to state and national child resident populations (Screener and Topical file) and households with children (Screener file).

- *Estimation, Hypothesis Testing, and Data Use Guidelines.* A discussion for the best practices for data users and limitations of the 2019 NSCH.

[2] The Office of Management and Budget Clearance Package is available at https://www.reginfo.gov/public/do/PRAViewDocument?ref_nbr=201903-0607-004

Survey History

The Health Resources and Services Administration's Maternal and Child Health Bureau (HRSA MCHB), within the U.S. Department of Health and Human Services (HHS), has sponsored the National Survey of Children's Health (NSCH)[3] and its companion survey, the National Survey of Children with Special Health Care Needs (NS-CSHCN),[4] since 2001. HRSA MCHB has provided funding and direction for the two periodic surveys in order to provide both national and state estimates of key indicators of child health and well-being for children ages 0-17 years.

Together, these surveys provided critical data on key measures of child health; the presence and impact of special health care needs; health care access, utilization, and quality; and the family and community factors that impact child and adolescent health and well-being. Both surveys were fielded three times (NS-CSHCN 2001, 2005-06, and 2009-10; NSCH 2003, 2007, and 2011-12) as modules of the State and Local Area Integrated Telephone Survey (SLAITS) system by the Centers for Disease Control and Prevention's National Center for Health Statistics. As part of the SLAITS system, the surveys utilized a random-digit-dial sample of landline telephone numbers, with cell-phone supplementation in the last year of administration for both surveys.

While the geographic representation, sample size, and content breadth remained significant strengths of the surveys, over time HRSA MCHB and its stakeholders came to realize that a redesign of the two surveys was warranted. Declining response rates, along with the declining proportion of households in the U.S. with landline telephones, led to the decision to change the underlying sampling frame from telephone numbers to household addresses. Efforts were made to moderate this trend through the addition of a cell-phone frame to the last administrations of both the NSCH and the NS-CSHCN. However, consistent with industry-wide challenges, the inclusion of cell-phone samples proved to be both costly and inefficient.

In 2015, HRSA MCHB redesigned the NSCH and the NS-CSHCN into a single combined survey that utilized an address-based sampling frame. This newly consolidated survey incorporated questions from both of the former surveys and retained the NSCH name. The U.S. Census Bureau now conducts the NSCH annually on behalf of HRSA MCHB and HHS under Title 13, United States Code, Section 8(b), which allows the Census Bureau to conduct surveys on behalf of other agencies.

Challenges faced by NSCH/NS-CSHCN and Subsequent Redesign

The telephone interview methodology utilized for the former NSCH and NS-CSHCN allowed for a complex questionnaire as it ensured that skip patterns were properly followed. Furthermore, it

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[3] Blumberg SJ, Foster EB, Frasier AM, et al. 2012. Design and Operation of the National Survey of Children's Health, 2007. National Center for Health Statistics. *Vital Health Stat,* 1(55). http://www.cdc.gov/nchs/data/series/sr_01/sr01_055.pdf

[4] Bramlett MD, Blumberg SJ, Ormson AE, et al. 2014. Design and Operation of the National Survey of Children with Special Health Care Needs, 2009–2010. National Center for Health Statistics. *Vital Health Stat,* 1(57). http://www.cdc.gov/nchs/data/series/sr_01/sr01_057.pdf

protected against data entry error through preprogrammed range and logic checks on responses. Interviewers were able to address respondent questions and concerns as they arose, helping reduce response error. However, in recent years declining willingness of the public to participate in surveys and changes in household telephone use resulted in declining response rates for Computer-Assisted Telephone Interviewing surveys.[5] Of particular concern was the increasing prevalence of households substituting wireless service for their landline telephone. Efforts to include these non-landline households within the telephone sampling frames for the former NSCH and NS-CSHCN through the addition of cell-phones to the frame were ultimately not cost efficient or effective. Furthermore, because the former NSCH and NS-CSHCN were administered using the Centers for Disease Control and Prevention's National Immunization Surveys (NIS) sampling frame and followed behind the NIS interview, they experienced additional impacts in response rates when cases failed to move through the NIS itself.

The surveys were no longer sustainable in the face of declining response rates and rising costs. Therefore, considerable work was done to determine how to address these issues, and the decision was reached to utilize a two-phase multimode data collection design for a combined NSCH/NS-CSHCN survey, henceforth known as the NSCH. The proposed approach to data collection and nonresponse follow-up was based on previous project experience and recommendations made by Dillman and colleagues (2009).[6]

The redesigned NSCH consists of two questionnaires: (1) an initial household screener to assess the presence of children in the home and facilitate the selection of a target child within the household (with oversampling of children with special health care needs and young children ages 0-5 years), and (2) a substantive topical questionnaire that combines selected content from the former NSCH and NS-CSHCN questionnaires along with new content to address emerging public health topics.

Revisions to existing items were generally made for the following reasons: 1) a desire for consistency with federal policies or programs and harmonization of content across U.S. Department of Health and Human Services surveys (e.g., the item on physical activity was edited to reflect the new Dietary Guidelines for Americans); 2) changes in the field or the understanding of a topic or issue (e.g., with direction and support from co-sponsors, content on attention deficit/hyperactivity disorder treatment was expanded to include separate items on behavioral and medication treatment); and 3) self-administered surveys require wording and framing that differs from interviewer-assisted surveys (i.e., instructional text throughout the instrument was refined and simplified).

Concomitantly, the addition (or deletion) of content was driven by four factors: 1) the need to include the most critical content from both former surveys; 2) the prioritization of topics highly relevant to HRSA MCHB investments (e.g., items required to track National Performance and Outcome Measures for the

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[5] Blumberg SJ, Luke JV. 2010. Wireless Substitution: Early Release of Estimates from the National Health Interview Survey, January–June 2010. National Center for Health Statistics. Available from: http://www.cdc.gov/nchs/nhis.htm

[6] Dillman DA, Smyth JD, Christian LM. 2009. Internet, Mail and Mixed-Mode Surveys: The Tailored Design Method, 3rd edition. Hoboken, NJ: John Wiley & Sons.

Title V Maternal and Child Health Services Block Grant program); 3) the commitment to improve methods for assessing key topics; and 4) the desire to address emergent priorities as identified by states and the broader maternal and child health field (e.g., the addition of items to assess readiness to learn among children aged 3-5 years).

Frame, Sample, and Selected Child Subsample

This section covers frame development, sample selection, experimental treatment group assignments within the sample, and the selected child subsample process.

Frame and Sample Selection

The 2019 NSCH uses an address-based sample selected from an extract of the Census Bureau's Master Address File (MAF)[7]. It covers the 50 states and the District of Columbia[8]. The sample frame uses administrative records-based flags to identify three mutually exclusive strata:

- Stratum 1: Addresses that are explicitly linked to children using administrative records. Approximately 80% of these addresses are households with children.
- Stratum 2a: Addresses that are probabilistically linked to children using administrative records and block group characteristics. Approximately 15% of these addresses are households with children.
- Stratum 2b: The remaining addresses. Less than 3% of these addresses are households with children.

Addresses assigned to Stratum 1 are explicitly linked to a child record either directly or through a parent using administrative records. Administrative record sources include:

- Master Address Auxiliary Reference File (MAF-ARF) (for household addresses)
- 2010 Census unedited file
- Social Security Data
- the IRS 1040, and 1099 files
- the Medicare Enrollment Database (MEDB)
- Indian Health Service database (IHS), Selective Service System (SSS)
- Public Indian Housing (PIC)
- American Community Survey and CPS-ASEC data (for parent-child links)
- Tenant Rental Assistance Certification System (TRACS) data from the Department of Housing and Urban development (HUD)
- National Change of Address data from the US Postal Service

For 2019, the sample added Department of Housing and Urban Development (HUD) data to supplement Stratum 1. Administrative HUD PPIC and TRACS data identified additional children in public housing and voucher households.

In 2019, there were 40 million unique addresses linked to households with children.

[7] The MAF is a Title 13 data source, and all data collected are confidential under 13 U.S.C. Section 9. All access to Title 13 data from this survey is restricted to Census Bureau employees and those holding Census Bureau Special Sworn Status pursuant to 13 U.S.C. Section 23(c).
[8] Hereafter, 'state' will include the District of Columbia.

Among the remaining addresses, a linear probability model was developed against American Community Survey (ACS) returns to predict child presence using block group[7] characteristics and administrative records associated with the address (e.g., presence of adults 20-50 years old and child-related tax deductions). Addresses were sorted on the probability of child presence by state. The size of Stratum 2b in any state was constrained so that it represents no more than 5% of households with children in that state.

The sample for the 2019 NSCH includes approximately 184,000 unique addresses. The sample includes addresses from Strata 1 and 2a; Stratum 2b addresses were excluded from sampling. For the sample selection:

- The addresses within the state were first sorted by strata, then organized into two groups by the block group[9] poverty rate to ensure states had proportional representation of addresses in high poverty areas selected for the sample.
- The sampling rate by strata in each state is optimized to maximize the number of completed interviews per address selected (selecting more addresses from Stratum 1) while constraining the impact of the design effect on variance. Nationally, 60% of addresses came from Stratum 1 and 40% from Stratum 2a.
- The sample was distributed across states to produce a roughly equal number of completed interviews per state (see Attachment A).
- To minimize respondent burden, addresses can be included in the sample only once in any five year period.

Treatment Groups

The survey sample of 184,000 was divided into treatment and control groups for various experiments. The 2019 NSCH groups are:

- Screener cash incentives: $0 (control), $2, or $5 screener incentive
- High Web/High Paper: Web push invitation suite, or web and paper invitation suite
- Envelope design: Traditional (control) or redesigned envelope invitation suite
- Screener card test: Traditional (control) or screener card invitation suite
- Topical cash incentives: $0 (control), $2, or $5 topical incentive

For the screener cash incentive, 90% of the sample received a small denomination bill with the initial invitation as an incentive to complete the survey, half receiving a $2 bill and the other half a $5 bill. The other 10% of the sample did not receive an incentive and represented the control group for monitoring the effectiveness of the incentive treatments.

[9] A Census block group is a geographical unit with 600 to 3,000 population. Census blocks are grouped into block groups; block groups, in turn, are grouped into Census tracts. The block group is the smallest scale geographical unit for which the Census Bureau publishes sample statistics, i.e., estimates based on a sample of residents in the block group. Consequently, it is the smallest scale geographical unit that could be used for this exercise.

The High Paper treatment group was composed of the 30% of the addresses identified as having the highest probability of responding by paper and not by web. These addresses received both a paper screener questionnaire and an invitation for the web screener questionnaire with the initial invitation. The remaining 70% of addresses were assigned to the High Web group. These addresses received only a web invitation in the first two mailings, but received a paper questionnaire in the final two mailings. More information about the mailout schedule is included in the Data Collection section.

For the envelope design test, 50% of addresses were mailed the initial invitation in a redesigned envelope and the other 50% received the invitation in the traditional design from 2018. The redesigned envelope added colors and graphics to the traditional envelope design. See Attachment B for information copies.

Finally, 4,000 addresses were assigned to test a new response mechanism, the screener card. Screener card test case responses were not included in the production data files.

Selected Child Subsample

The screener questionnaire collects information on the presence of children within the household, child demographic information, and basic questions about each child's health. [10] One child is selected from the completed screener, and one of the three age-based topical questionnaires is provided to the household based on the sampled child's age:

- NSCH-T1: children aged 0 through 5,
- NSCH-T2: children aged 6 through 11, or
- NSCH-T3: children aged 12 through 17

The probability of selection for a child is based on the number of children in the household, the special health care needs status, and the age of the child. When appropriate, an 80% oversample is applied to children with special health care needs and a 60% oversample to young children (ages 0-5).[11] See attachment C for more details.[12]

Upon completion of the screener questionnaire, Web respondents are immediately brought to the appropriate topical questionnaire web page. For mailed-in screener responses, the appropriate topical questionnaire is mailed to the household, and mail materials indicate which child has been selected.

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[10] Bethell CD, Read D, Neff J, Blumberg SJ, Stein RE, Sharp V, Newacheck PW. 2002. "Comparison of the Children with Special Health Care Needs Screener to the Questionnaire for Identifying Children with Chronic Conditions—Revised." *Ambulatory Pediatrics*, Jan-Feb 2(1): 49-57.

[11] The 80% oversample is applicable only for those households with both CSHCN and Non-CSHCN present. The 60% age-based oversample is applicable when the conditions of the CSHCN oversample are not met and there are both young (ages 0-5) and older (ages 6-17) children present.

[12] Eligible children in a household are sorted first by special health care needs status (CSHCN then Non-CSHCN) and then by age (youngest to oldest). Additionally, children with the same special health care needs status and age are sorted by name. In households with four or more eligible children, children are sorted first on special health care needs status, then alphabetically by name, and then by age.

Additionally, incentives are used in the first mailing to each topical group. 90% of these households receive a $5 incentive while 10% do not receive an incentive.

Data Collection

Data collection efforts for the 2019 National Survey of Children's Health (NSCH) began on June 28, 2019 and continued until January 17, 2020. The 2019 NSCH retained a two-phase data collection approach: (1) an initial household screener to assess the presence, basic demographic characteristics, and special health care needs status of any children in the home; and (2) a substantive topical questionnaire to be completed by a parent or caregiver of the selected child. The data collection methodology follows strategies to increase response rates, including offering multiple ways to respond, treatments and non-response follow-up.

This section covers survey content and 2019 content changes, data collection instruments, and the data collection process.

Survey Content

Questionnaires were designed to encourage cooperation by prospective respondents, enhance respondent comprehension, and make instructions clear and simple. Questions were developed and grouped by subject area to create logical, clear questionnaires with concrete question wording and simple grammar.

The screener questionnaire consisted of two sections. The first section contained four questions about the presence of children in the home, the primary language spoken, and home tenure (rent or own). The next section contained detailed questions about the demographics and health of up to four children, from youngest to oldest. If there were more than four children in a household, the first name (or initials or nickname), age, and sex were asked for up to ten children.

There were three different topical questionnaires tailored to three age groups of the selected children: NSCH-T1 for 0 to 5 year old children, NSCH-T2 for 6 to 11 year old children, and NSCH-T3 for 12 to 17 year old children. All three questionnaires contained 11 sections about the child, their family, and neighborhood, but the specific questions were tailored to be relevant to children in that age specific range. Copies of the screener and topical questionnaires can be found at https://www.census.gov/programs-surveys/nsch/technical-documentation/questionnaires.html.

Section A. This Child's Health
Questions about whether the child has current or lifelong physical, mental, behavioral, learning, or developmental conditions. Additional questions on whether the child's health conditions affect their ability to do things.

Section B: This Child as an Infant
Birth-related questions including birth weight, breastfeeding, and use of formula. Infant feeding questions are only included on NSCH-T1.

Section C: Health Care Services
Questions about source of a usual place for health care, need for and use of medical, dental, mental, and specialized health services in the last 12 months.

Section D: Experience with This Child's Health Care Providers
Questions about frequency of care and satisfaction with the child's health care providers. Also, questions about how the child's doctor or health care provider worked with the child. NSCH-T3 includes questions about the child's preparation for transition into adult health care.

Section E: This Child's Health Insurance Coverage
Questions about whether the child has adequate health care insurance coverage, and whether there were any gaps in health care insurance coverage in the past 12 months, including at the time of the survey.

Section F: Providing for this Child's Health
Questions on cost of health care in the past 12 months and time spent providing and arranging for the child's health care.

Section G: This Child's Learning/Schooling and Activities
Questions on early language development and learning for children ages 1 to 5 years. For children ages 6 to 17 years, questions about experiences at school, participation in organized activities, and physical activities.

Section H: About You and This Child
Questions about daily life and household activities, including the child's sleep habits, screen time, and the demands of parenting/caregiving on the respondent.

Section I: About Your Family and Household
Questions about the frequency of family meals, the use of tobacco in the household, how the family copes with problems, and if any assistance is needed to provide food for the family. Also questions about the respondent's perception of their neighborhood (e.g., amenities, safety), and questions about whether the child has ever experienced any adverse childhood experiences.

Section J: Child's Caregivers
Questions on demographic information about up to two adults in the household who are the child's primary caregivers.

Section K: Household Information
Questions on household count, family count, and family income.

2019 Content Changes

Three variables were added in 2019 NSCH questionnaires and reported on the public use data files:

- BIRTH_YR ("What year was this child born?")
- BIRTH_MO ("What month was this child born?")
- BIRTH_YR_F (a data quality flag for BIRTH_YR and BIRTH_MO)

The BIRTH_YR and BIRTH_MO variables are in the topical data file and captured in NSCH-T1, NSCH-T2, and NSCH-T3. The BIRTH_YR_F variable is a flag in the topical data file to indicate if

the topical questionnaire birth month and year is consistent with the screener questionnaire birth month and year.

Additionally, the response option "Some other race" was removed from SC_RACE_R and C_RACE_R in 2019 to follow the standards of the Office of Management and Budget (OMB).[13] Additional differences between the 2016, 2017, 2018, and 2019 NSCH questionnaires are noted in the NSCH crosswalk: https://census.gov/programs-surveys/nsch/technical-documentation/codebooks.html

Data Collection Instruments

The data collection design focuses on efforts to increase response rates. Respondents have multiple ways to respond to the survey and receive assistance including:

- Web Instrument (English and Spanish)
- Paper Instrument (English and Spanish)
- Telephone Questionnaire Assistance (TQA) (available in several languages)
- Email Questionnaire Assistance (EQA)
- Spanish Language Translation

Web Instrument

The web survey was programmed using the U.S. Census Bureau's Centurion system for internet data collection. This software presented the questionnaire on a computer screen or other electronic device, e.g., tablet or cell phone. The interview was self-administered by the respondent. The respondent logged in to the web survey by accessing the URL provided on the mailed invitation and entering their unique 8-digit login ID.

Respondents were asked to verify their address. If the respondent answered that the address selected for the sample (and displayed on screen) did not match their own, the survey was concluded and the address was removed from further mailings.

If the listed address matched the respondent's residence, the case was assigned a PIN that the respondent would need to log back in to the survey. Alternatively, the respondent could create a new PIN by correctly answering a security question, which the respondent previously provided during the original PIN creation process.

After setting up the PIN, the respondent reported the number of children (0-17 years of age) that usually reside at that address. If there were no children that usually reside at the address, the survey was concluded and the address removed from further mailings. If there were children that usually reside at the address, the respondent was then directed through the rest of screener questionnaire.

There were two hard edits programmed into the web instrument which required respondents to provide a valid answer before continuing. These answers were necessary for subsampling: child's first name,

[13] The NSCH survey uses the race categories defined in the 1997 OMB Standards for the Classification of Federal Data on Race and Ethnicity.

initials, or nickname; and age. Respondents were able to skip all other questions and continue the survey.

After the respondent completed the screener questionnaire, the web instrument applied the subsampling methodology to select one child from each household to be the subject of the topical questionnaire. At this point in the survey process, content from the screener portion of the questionnaire was locked.

The name and sex of the selected child was then prefilled into the topical survey questions, and the web instrument guided respondents through skip patterns. Some response fields only accepted responses that represented legitimate values; other fields offered a "pick list" of response categories. There were soft edits for some questions that prompted respondents to provide an answer or revise an existing answer, but respondents were able to continue past these edits without changing their answers.

Respondents could review and edit any answers before submitting. Once the survey was submitted, a submission confirmation screen appeared with the date and time of completion. The instrument was then locked and the respondent was only able to view the submission confirmation screen if they logged back in. Submitted responses were saved in the output data file.

Respondents from households without children completed the web instrument in an average of 1 minute, 26 seconds. Respondents from households with children completed the screener portion of the instrument in 5 minutes, 32 seconds; the web topical portion in 31 minutes, 22 seconds; and the entire web instrument in 36 minutes, 54 seconds, on average. Online help screens and text were also available in the instrument to aid respondents.

Table 1. Web Submission Times (in minutes)

	With Children		**No Children**	
	Mean	**Median**	**Mean**	**Median**
Screener	5.5	4.3	1.4	0.8
Topical	31.4	26.7		
Total	36.9	31.7	1.4	0.8

Paper Instrument

The second mode of data collection was a two-phase, self-administered mail survey using paper questionnaires. The paper questionnaires were created using Amgraf One Form Plus. They were printed, trimmed, and stitched through an in-house print on-demand process using a Docuprint system that allowed personalization to each respondent.

In the first phase of this mode of data collection, paper screener questionnaires were mailed to High Paper addresses with the initial invitation, and to all other addresses (High Web) with the second non-response follow-up mailing.[14] Respondents completed a screener questionnaire to determine if there

[14] More information on the High Paper/High Web group assignments is covered in the Mailout Content and Schedule section.

were any children 17 years of age or younger who usually lived or stayed at the address. Resident children were rostered in the screener instrument. Detailed information was collected for up to four children, while basic information (name, age, sex) was collected for an additional six children.

If the respondent mailed back the screener, it was then processed to determine if eligible children usually reside at the address. Returned forms were processed by iCADE to capture responses through OMR (optical mark recognition), OCR (optical character recognition), and KFI (keying from image). If the respondent answered that the address selected for the sample did not match their own or that there were no children that usually reside at the address, the survey was concluded and the household was removed from further mailings. If the respondent listed children that usually reside at the address, Census Bureau staff applied the subsampling methodology to select one child from the household roster to be the subject of the topical questionnaire.

In the second phase, households that reported eligible children were mailed one of the three age-based topical questionnaires requesting more information about one selected child living at the address. In order to ensure respondents answered the topical questions for the selected child, Docuprint systems printed the selected child's first name, initials, or nickname, age, and sex provided on the screener questionnaire onto the topical questionnaires and survey invitation letters.

The paper and web instruments were designed to be as similar as possible to minimize the influence of mode on responses. While automatic skips and soft edits could not be implemented in the paper instrument, the questionnaire did include skip instructions within the question wording to mimic the web instrument.

Telephone Questionnaire Assistance (TQA)

The National Processing Center call center in Tucson, Arizona provided telephone questionnaire assistance (TQA) for the 2019 NSCH. Respondents could call a toll-free telephone line if they had questions about the survey, wanted to complete the interview over the phone using the web instrument, or submit feedback. All mail content and the web instrument listed this toll-free number.

Interviewers were trained to use the Automated Tracking and Control (ATAC) system to report call-ins using one of the following TQA purpose codes seen in Table 2.

Table 2. TQA Purpose Codes used in ATAC System

TQA Purpose Codes	Definitions
01	Internet questionnaire completed over the phone
02	Refusal to participate
03	Wrong address – paper respondent
04	Wrong address – web respondent
06	Paper questionnaire status
09	Out of scope (vacant, business, not a full-time residence)
12	Child listed on questionnaire moved or doesn't live at this residence most of the time
20	Questions about monetary incentive
21	Questions about prior mail never received
30	Request replacement survey (English)
31	Request Spanish language questionnaire
32	Trouble filling out the paper questionnaire
33	Child listed on questionnaire is deceased
49	Respondent requested PIN
50	Respondent requested Login ID
51	Problem logging into Internet instrument
52	Other instrument issues
53	PIN/security question reset request
54	Screener card test case only (0 children)
55	Screener card test case only (1 child)
56	Screener card test case only (2 children)
57	Screener card test case only (3 children)
58	Screener card test case only (4+ children)
60	Question regarding the survey (General FAQ)
80	Comments

Call monitoring sessions of recorded TQA calls were scheduled throughout data collection. If any changes were needed to the ATAC TQA instrument based on comments received from interviewers, the survey team coordinated programming updates. All updates to procedures were communicated to the TQA interviewers. Incoming call volumes were also monitored throughout data collection and interviewer schedules were adjusted accordingly.

In 2019, approximately 2,500 TQA cases were recorded in ATAC. The most common cases included internet questionnaire completed over the phone (~1,400), comments (~500), and out of scope (~150).

Email Questionnaire Assistance (EQA)

In addition to the toll-free telephone line, respondents were able to interact with Census Bureau staff via email. An email address (childrenshealth@census.gov) was listed on all invitation letters and on the Centurion login page. Emails were answered by call center staff in Tucson, Arizona. Staff checked the email inbox daily and replied to respondents' messages within 2 business days when possible. Emails were logged in a tracking spreadsheet and cases were assigned purpose codes similar to the TQA purpose codes in Table 2.

EQA agents employed scripted responses for common concerns and questions. These scripts ensured consistent and accurate information. When replying to the messages, agents removed any information in the response email that could be considered personally identifiable (e.g., address, phone number, name).

Spanish Language Translation

The NSCH paper and web instruments were available in both English and Spanish. The Census Bureau reviewed and verified text from the 2018 Spanish-language questionnaires and provided new translations where necessary for the 2019 questionnaires. Respondents were provided instructions to request a Spanish language questionnaire by calling TQA. Spanish-speaking respondents that called the TQA line were placed in a Spanish language calling queue; a trained Spanish language agent then answered any questions or administered the Spanish language web instrument over the phone. The agent flagged the case if a Spanish paper questionnaire was requested and informed the respondent that a questionnaire would arrive in the mail within three weeks.

If a respondent returned a Spanish language paper screener questionnaire indicating the presence of children in the household, the Spanish language topical questionnaire was subsequently mailed to the household. The web instrument included a toggle on every page that allowed respondents to switch between the English or Spanish language version of the instrument.

Mailout Content and Schedule

Respondent contact strategies and letters were carefully designed to capture the attention of the respondent and pique interest in the subject matter. Cash incentives, follow-up mailings, reminder postcards, toll-free telephone numbers, and translated questionnaires were used to maximize response.

Data collection for the 2019 NSCH involved a series of mailings and nonresponse follow-up activities, emphasizing questionnaire completion. Mailouts began Friday June 28, 2019 and continued until the survey closeout on Friday January 17, 2020. The approach to data collection and nonresponse follow-up was based on previous project experience and recommendations made by Dillman and colleagues (2009):[15]

[15] Dillman DA, Smyth JD, Christian LM. 2009. Internet, Mail and Mixed-Mode Surveys: The Tailored Design Method, 3rd edition. Hoboken, NJ: John Wiley & Sons.

- *Invitation letter*. An initial invitation letter was mailed to all potential respondents providing details about the study, a web URL with the login ID for accessing the web version of the questionnaire (which combined the screener and topical into a consolidated instrument), and a toll-free number and email address for individuals to contact if there were questions or comments.
- *Additional mailings*. Subsequent to the first invitation mailing, the Census Bureau sent all remaining non-respondents additional invitations. Addresses also received reminder postcards after the first two mailings.

The production mailing schedule for the 2019 NSCH is summarized below in Table 3.

Table 3. Production Mailout Schedule

Date	Event
Friday, June 28, 2019	Initial Screener Invitation
Friday, July 05, 2019	High Web - Reminder Postcard
	High Paper - Reminder Postcard
Friday, July 26, 2019	Low Paper – 1st Follow-Up Invitation
Friday, August 02, 2019	High Paper - 1st Follow-Up Invitation
	Low Paper - Reminder Postcard
Friday, August 9, 2019	High Paper - Reminder Postcard
Friday, August 16, 2019	1st Topical Mailing
Friday, August 23, 2019	Low Paper - 2nd Follow-Up Invitation
	Topical Reminder Postcard – Group A
Friday, August 30, 2019	2nd Topical Mailing
Friday, September 06, 2019	High Paper - 2nd Follow-Up Invitation
	Topical Reminder Postcard – Group B
Friday, September 13, 2019	3rd Topical Mailing
Friday, September 20, 2019	Topical Reminder Postcard – Group C
Friday, September 27, 2019	4th Topical Mailing
	Low Paper - 3rd Follow-Up Invitation
Friday, October 4, 2019	Topical Reminder Postcard – Group D
Friday, October 11, 2019	High Paper - 3rd Follow-Up Invitation
	5th Topical Mailing

Date	Event
Friday, October 18, 2019	Topical Reminder Postcard – Group E
Friday, October 25, 2019	6th Topical Mailing
Friday, November 01, 2019	Topical Reminder Postcard – Group F
Friday, November 08, 2019	7th Topical Mailing
Friday, November 15, 2019	Topical Reminder Postcard – Group G
Friday, November 22, 2019	8th Topical Mailing
Friday, November 29, 2019	Topical Reminder Postcard – Group H
Friday, December 06, 2019	9th Topical Mailing
Friday, December 13, 2019	Topical Reminder Postcard – Group I
Friday, January 17, 2020	Survey Closeout

Initial Screener Invitation

The initial mailing included the following treatment groups:

- High Paper (30% of addresses): A paper questionnaire was included with the initial invitation in place of the standard web-push strategy
- Cash incentive (90% of addresses): 45% of addresses received a $2 bill, 45% received a $5 bill
- Envelope redesign (50% of addresses): The initial invitation was packaged in a redesigned envelope with simple colors and graphics in place of the traditional envelope
- Screener card (4,000 addresses): In place of the traditional invitation letter, a small test group was selected to receive the new screener card instrument

High Paper, cash incentive and envelope redesign assignment were independent of one another, so non-screener card test cases received one of eight package types. The screener card test cases were assigned to one of three treatments that varied the sequence of mailings. In total, there were eleven package types used for the initial mailing.

Screener Reminder Postcards

Pressure-sealed reminder postcards were sent 5 to 7 days after the initial and first non-response follow-up mailing. The pressure-sealed reminder postcard included the necessary details for the respondent to complete the survey by web.

Screener Non-response Follow-up Mailings

The screener data collection strategy included three non-response follow-up attempts[16]. With the second follow-up mailing, High Web addresses received their first paper screener. All nonresponding addresses received paper screeners in this and all subsequent follow-up mailings.

Topical Questionnaire

Respondents that returned a complete paper screener with eligible children and did not submit a web survey were assigned to one of nine topical mailing groups (A through I). Group assignments depended on the date that the National Processing Center received the paper screener questionnaire and the next mailing date of topical questionnaires.

The topical questionnaire and accompanying cover letter were personalized with the sample child's name and other identifying information to ensure that the survey was completed for the correct child. In their first topical mailing, 90% of addresses received an unconditional $5 bill as a token of appreciation for participating in the survey. Following on the success of the reminder postcards with the screener mailings in previous survey administrations, the 2019 NSCH also mailed a reminder postcard one week after the initial topical mailing. Household could receive of up four topical mailings.[17]

Screener Card Test

Cases selected for the screener card treatment received invitations based on one of three mailout schedules. These groups were designed to evaluate different data collection priorities: Group B prioritized screener card response, Group D prioritized web response, and Group C represented a more balanced approach. The schedules included initial mailings and follow-up content as shown in Table 4.

[16] Addresses stopped receiving mailings if the residents submitted a web survey, returned a complete paper screener, explicitly refused to participate, or if the address was out-of-scope (i.e., not an occupied residence). The address also received fewer mailings if the USPS determined the address to be undeliverable as addressed.

[17] Respondents received fewer packages if they returned a topical form or explicitly refused to participate, the selected child no longer resided at the address when the topical form was received, or the household was assigned to a later topical group.

Table 4. Screener Test Card Mailout Schedule and Content

Date	**Friday June 28, 2019**	**Friday July 05, 2019**	**Friday July 26, 2019**	**Friday August 02, 2019**
Event	**Initial Mailings**	**1st Follow-up**	**2nd Follow-up**	**3rd Follow-up**
Group B	Web Push letter with screener card & return envelope	Pressure sealed reminder postcard	Web Push letter with screener card & return envelope	Pressure sealed reminder postcard
Group C	Web Push letter that mentions a screener card is forthcoming	Web Push letter with screener card & return envelope	Web Push letter with screener card & return envelope	Pressure sealed reminder postcard
Group D	Web Push letter that does not mention a screener card is forthcoming	Pressure sealed reminder postcard that mentions a screener card is coming	Web Push letter with screener card & return envelope	Pressure sealed reminder postcard

Response Analysis

Response Rates

Table 5 provides a summary of the survey completion counts. 68,500[18] households completed a screener portion of the survey. Of those, 36,196 reported children and are included on the Screener data file.

Complete and sufficient partial topical questionnaires are included on the Topical Public Use File. Of the 36,196 screened households with children, 29,433 returned a complete or sufficient partial topical survey. In 2019, 79.2% of respondents completed the survey using the web instrument and 20.8% of respondents completed the survey using the paper instruments.

Table 5. 2019 Final Dispositions (Unweighted)

Final Disposition	Count
Total Cases	180,000[a]
Occupied Households (Estimated)	144,000[a]
Households with Children (Estimated)	81,000[a]
Completed Screeners	68,500[b]
Screeners with Children	36,196
Completed Topicals	29,433

[a] Rounded to the nearest thousand

[b] Rounded to the nearest five hundred

For the purposes of calculating response rates, all sampled addresses were assigned screener and topical outcomes codes. These outcomes can generally be categorized as not eligible, eligible but not complete, or complete.

For some addresses, we did not receive sufficient correspondence to determine if the address was eligible to complete the screener or topical questionnaires. These addresses were classified as unresolved. Among these addresses, we estimated the share that were occupied residences using the Household Rate, which is the proportion of resolved addresses that are occupied residences.[19] We also estimated the Child Rate, which is the share of those households that include children, based on the proportion of households that have children by state and stratum in the 2017 American Community Survey (ACS). The product of the Household Rate and Child Rate is the Eligibility Rate (e), the estimated proportion of unresolved addresses that are households with children. Using this approach, we

[18] Rounded to the nearest five hundred based on the U.S. Census Bureau disclosure avoidance practices.

[19] Specifically, we used the midpoint between the Household Rate including undeliverable addresses (the proportion of all resolved addresses that are occupied residences) and the Household Rate excluding undeliverable addresses (UAAs) by state and stratum. Because UAAs are identified by the U. S. Postal Service, it is assumed that UAAs are identified at a higher rate than other noneligible addresses (businesses, vacant residences, etc.) that must be self-identified. The midpoint assumes that there are some UAAs still unresolved but at a lower rate than they appear among the resolved addresses.

estimated that 86% (weighted) of unresolved addresses were households and 41% (weighted) of those households with children.

$$e = Household\ Rate * Child\ Rate$$

Three different response rates were calculated based on the estimated proportion of eligible addresses that completed the screener and topical questionnaires. Definitions of completion and calculation of these three response rates are detailed below.

Screener Completion Rate

The Screener Completion Rate (SCR) is the estimated proportion of households (occupied residences) that completed a screener. A completed screener had to 1) be returned from a sampled address, and 2) indicate that there were no children present or provide a valid age for at least one child. The denominator includes both screened households and the number of unresolved addresses that are estimated to be households.

$$SCR = \frac{Completed\ Screeners}{Screened\ HHs + (Unresolved\ Addresses * Household\ Rate)}$$

Topical Completion Rate

The Topical Completion Rate (TCR) is the estimated proportion of households with children that submitted a topical questionnaire, either complete or sufficient partial. Completed topical questionnaires have valid answers for at least 40 of 50 test questions and at least one item in Section K (family income, household and family count), or the respondent submitted the topical portion of the web instrument. Sufficient partial topical questionnaires have valid answers for at least 25 of 50 test questions and at least one item in Section H or beyond, or the respondent submitted the topical portion of the web instrument. The denominator includes both screened households with children and the number of unresolved addresses that are estimated to be households with children (Unresolved Addresses * e).

$$TCR = \frac{Completed\ Topicals}{Screened\ HHs\ with\ Children + (Unresolved\ Addresses * e)}$$

Interview Completion Rate and Overall Response Rate

The Interview Completion Rate (ICR) and Overall Response Rate (ORR) account for the multi-stage design of the NSCH. They are the products of two (for ICR) or three (for ORR) response rate metrics that are each consistent with the American Association for Public Opinion Research (AAPOR) standards[20]. The ICR is the probability a household progresses through the screener and topical portions of the survey.

$$ICR = Screener\ Conversation\ Rate * Topical\ Conversion\ Rate$$

[20] The American Association for Public Opinion Research. 2016. *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys. 9th edition.* AAPOR.

The Screener Conversation Rate is the proportion of resolved households that completed the screener.

$$Screener\ Conversion\ Rate = \frac{Completed\ Screeners}{Resolved\ Households}$$

The Topical Conversation Rate is the proportion of screened households with children that completed a topical.

$$Topical\ Conversion\ Rate = \frac{Completed\ Topicals}{Screened\ Households\ with\ Children}$$

The Overall Response Rate (ORR) is the probability an address progresses from resolution to screener complete to topical complete and is given by the equation below,

$$ORR = Resolution\ Rate * Screener\ Conversation\ Rate * Topical\ Conversion\ Rate$$

where the Resolution Rate is the proportion of addresses in sample that were resolved as occupied households. In 2019, the weighted Resolution Rate was 52.2%.

$$Resolution\ Rate = \frac{Resolved\ Addresses}{Total\ Addresses}$$

Table 6 lists the weighted rate for each of the four response metrics discussed above. A breakdown of the response rates by state is provided in attachment D.

Table 6. 2019 NSCH Weighted Response Rates

Metric	Rate
Screener Completion Rate	47.8%
Topical Completion Rate	35.3%
Interview Completion Rate	79.5%
Overall Response Rate	42.4%

Item-Level Response

The item response rate is the proportion of item-eligible respondents that provided a valid answer to a particular item. Many items were applicable to a subset of survey respondents only; for example, some questions were applicable to children in a specific age range. In that case, the denominator for the item response rate is the count of children in the eligible age range, and the numerator is the count of those children with valid responses.

In some cases, it is uncertain if the child was eligible for an item due to nonresponse on a preceding item. For example, before asking about the severity of certain conditions, we asked if the child currently had the condition. The severity item was applicable if the child currently had the condition, and it was not applicable if the child did not currently have the condition. If the respondent chose to skip the current condition filter item, we cannot know definitively if the severity item was applicable or not.

We account for this situation in the item response rate by assigning eligibility to cases with unknown eligibility equal to the proportion of cases that were eligible when eligibility was known. For example, if 10% of respondents reported that the child did have the condition currently, and so were eligible for the severity follow-up question, the denominator for the severity item response rate becomes

$$\#\ Eligible + (\#\ Eligibility\ Unknown\ *\ .1)$$

Across all survey items, more than 98% of response opportunities produced a valid response. Items that require a write-in response, that require respondents to follow a skip pattern, and are near the end of the survey tend to have higher nonresponse. Table 7 lists the 35 variables with the lowest item response rates. The list predominantly reflects items that are at the end of a skip pattern and are on-path for few respondents (e.g., DOWNSYN_DESC which captures the severity of a reported diagnosis of current Down Syndrome), items that require a write-in response (e.g., A2_LIVEUSA which captures how long a second caregiver has lived in the US), and items near the end of the survey (e.g., A2_PHYSHEALTH which captures the reported health status a second caregiver).[21]

Table 7. 35 Lowest Item Response Rates

Variable	Description	Response Rate	On-Path (%)
DOWNSYN_DESC	Down Syndrome Severity Description	89.4%	0.2%
GENETIC_DESC	Genetic Condition Severity Description	90.5%	4.7%
GENETIC_SCREEN	Genetic Condition Newborn Screening	90.9%	4.7%
K2Q35A_1_YEARS	Autism ASD - First Told Age in Years	91.8%	3.0%
SUBABUSE_CURR	Substance Use Disorder Currently	92.7%	0.2%
A2_LIVEUSA	Adult 2 - Come to Live in the United States (Year)	93.5%	12.6%
SLEEPPOS	Position Most Often Lay Your Baby Down to Sleep	94.4%	3.2%
K2Q38B	Tourette Syndrome Currently	95.6%	0.3%
BIRTHWT	Birth Weight Status	95.7%	100.0%
BIRTHWT_L	Birth Weight is Low (<2500g)	95.7%	100.0%
BIRTHWT_VL	Birth Weight is Very Low (<1500g)	95.7%	100.0%
BIRTHWT_OZ_S	Standardized Birth Weight, Ounces	95.7%	100.0%
K2Q35D	Autism ASD - First Told Doctor Type	95.8%	3.0%
A2_DEPLSTAT	Adult 2 - Deployment Status	95.8%	5.9%
A1_LIVEUSA	Adult 1 - Come to Live in the United States (Year)	95.8%	12.9%
ARTHRITIS_CURR	Arthritis Currently	96.0%	0.4%
CERPALS_DESC	Cerebral Palsy Severity Description	96.1%	0.3%
A2_BORN	Adult 2 - Where Born	96.1%	87.0%

[21] This table does not include the six poverty status implicates (FPL1-FPL6). Values are derived from several survey items, and partial responses are used to inform the multiple imputation. For comparison, 17.6% of respondents provide incomplete or inconsistent responses to those survey items used to derive FPL.

A2_PHYSHEALTH	Adult 2 - Physical Health	96.1%	87.0%
K5Q22	Arrange Or Coordinate As Much Help As Wanted	96.1%	4.6%
K12Q01_G	Reason Not Covered - Other	96.2%	6.0%
K12Q01_F	Reason Not Covered - Application/Renewal Problems	96.2%	6.0%
K12Q01_E	Reason Not Covered - Inadequate Providers	96.2%	6.0%
K12Q01_D	Reason Not Covered - Inadequate Benefits	96.2%	6.0%
K12Q01_C	Reason Not Covered - Unaffordable	96.2%	6.0%
K12Q01_B	Reason Not Covered - Cancellation Overdue Premiums	96.2%	6.0%
K12Q01_A	Reason Not Covered - Change in Employer/Employment	96.2%	6.0%
A2_MENTHEALTH	Adult 2 - Mental or Emotional Health	96.2%	87.0%
LIVEUSA_MO	How Long Living in the United States - Months	96.2%	3.1%
LIVEUSA_YR	How Long Living in the United States - Years	96.2%	3.1%
A2_K11Q50_R	Adult 2 - Employed 50 Out Of Last 52 Weeks	96.2%	87.0%
A2_MARITAL	Adult 2 - Marital Status	96.2%	87.0%
A2_GRADE	Adult 2 - Highest Completed Year of School	96.2%	87.0%
A2_ACTIVE	Adult 2 - Active Duty	96.3%	87.0%
A2_AGE	Adult 2 - Age in Years	96.4%	87.0%

Treatment Groups and Response

This section reviews response patterns based on the treatment group assignments:

- Screener cash incentive
- Topical cash incentive
- Envelope redesign
- High Web vs. High Paper

Screener Cash Incentive

In the 2019 NSCH, sampled addresses received either a $2 bill, a $5 bill, or they were part of the control group that did not receive a cash incentive in the initial screener mailing. The treatment groups represented 90% of the sample, with 45% of addresses receiving a $2 bill and 45% receiving a $5 bill. The remaining 10% of addresses made up the control group and received no incentive.

The screener cash incentives results in Table 8 show the average cost per completed screener questionnaires, the average cost per completed topical questionnaires, the percent of eligible households who completed a screener questionnaire, and the percent of eligible households who completed a topical questionnaire. The results in Table 8 show that providing an unconditional screener incentive in the initial mailing was an effective strategy for encouraging response. Eligible households that received a $5 incentive were more likely to complete the Screener and Topical questionnaires than households that received a $2 incentive or no incentive. Eligible households that received a $2 incentive

were more likely to complete the Screener questionnaire and Topical questionnaire than households that received no incentive.

Table 8. Average Cost per Completed Questionnaires and Percent of Eligible Households that Completed Questionnaires by Screener Cash Incentive Group

Screener Cash Incentive Group	Average Cost per Completed Screener	Percent of Eligible Households that Completed Screeners	Average Cost per Completed Topical	Percent of Eligible Households that Completed Topicals
Total	$21.70	46.9%	$56.78	36.5%
No Incentive	$16.34	41.2%	$45.67	31.0%
$2 Incentive	$19.43	46.3%	$52.26	35.6%
$5 Incentive	$24.86	48.9%	$62.91	38.7%

Topical Cash Incentive

The 2019 NSCH also used a $5 cash incentive in the initial topical mailing. Approximately 10% of cases were assigned to the control group (no incentive), with the remaining cases receiving the $5 incentive.

Table 9. Average Cost per Completed Topical Questionnaires and Completion Rate by Topical Cash Incentive Group

Incentive Group	Average Cost per Completed Topical	Completion Rate*
Total	$46.23	58.2%
No Incentive	$49.21	47.0%
$5 Incentive	$45.97	59.5%

*Percent of households that were mailed a paper topical invitation that subsequently completed a topical interview.

Households that received a $5 incentive were more likely to complete the topical questionnaire than households that received no incentive (see Table 9). Also, by reducing the number of non-response follow-up mailings, the topical incentive reduced the cost of data collection versus the control group.

Cash incentives were also relatively more effective among groups that were otherwise less likely to respond. For example, Table 10 shows the incentive effect on the probability of screener and topical response by education, race and poverty status. The cash incentive increased screener and topical response for all groups. But the effect was larger for less educated households, Black households (compared to White households), and households in poverty; the difference between these groups is statistically significant in all cases except for Black households compared to White households receiving the $2 screener incentive. Because less educated, Black and poor households are generally less likely to respond to the survey, incentives may reduce nonresponse bias.

Table 10. Screener and Topical Response Probability (Incentive versus No Incentive) by Education, Race, and Poverty Status

	Screener				Topical	
Education	**P($2 incentive) / P(control)**		**P($5 incentive) / P(control)**		**P($5 incentive) / P(control)**	
High School or less	113.5%	*	120.3%	*	130.7%	*
College or more	111.4%	*	117.1%	*	126.2%	*
HS vs. College	+2.1%	†	+3.2%	†	+4.6%	†
Race						
Black alone	115.9%	*	124.8%	*	149.3%	*
White alone	112.2%	*	118.1%	*	126.6%	*
Black vs. White	+3.7%		+6.8%	†	+22.7%	†
Poverty Status						
Poverty	115.7%	*	122.7%	*	139.2%	*
Not Poverty	112.3%	*	118.4%	*	127.6%	*
Poverty vs. Not	+3.4%	†	+4.2%	†	+11.6%	†

* H_0: P(incentive)/P(control) <= 1, p<0.05; † H_0: Difference <= 0, p<0.05

High Paper/High Web

Prior to mailing, all NSCH addresses were assigned a score based on the probability the address would respond by mail and would not respond by web. The 30% of addresses with the highest scores were assigned to the High Paper group. High Paper addresses were mailed a paper screener questionnaire with all mailed invitations. The other 70% of addresses were assigned to the High Web group. High Web addresses received their first paper screener in the second nonresponse follow-up.

Screener response was about 26% higher for the High Paper group. The mode of response correlated with our expectations: the High Paper group was more likely to respond by paper but less likely to respond by web compared to the High Web group.

The additional screener response from the High Paper group came at a cost, approximately $4.17 per case. The majority of this cost came from the paper topical follow-up effort to the High Paper addresses that returned a paper screener. High Web addresses were more likely to complete the web screener and topical in a single session. Also, households with children using the paper questionnaire were less likely to complete the topical questionnaire than those that used the web questionnaire. Consequently, the High Paper strategy was an efficient approach for collecting screener responses but less effective for collecting topical interviews.

Envelope Redesign

The envelope redesign did not significantly impact response probabilities. Addresses assigned to the envelope redesign group were not more or less likely to complete the screener or topical.

Data Processing

Data were processed and edited to ensure data quality and respondent confidentiality.

Unduplication

All nonresponding households were offered two modes, web and paper, for completing the survey. In some cases, respondents utilized both options. In these cases, we selected one response, web or paper, to include in the data file. We chose the response to include based on the type of return and the level of completeness. Completed web returns were always chosen over completed paper returns. However, completed paper returns were chosen over partial web survey returns. The web/paper unduplication hierarchy is detailed in Table 11.

Table 11. Unduplication Criteria for both Web and Paper Returns

Order Chosen	Type of Return
1	Completed web survey - Household with children
2	Completed paper screener and topical
3	Completed web survey - Household w/o children
4	Completed paper screener - Household w/o children
5	Partially completed web survey
6	Out of scope paper return
7	Refusal paper return, Hard Refusal
8	Incomplete, Duplicate
9	Blank, Soft Refusal
10	Deceased
11	Undeliverable address (UAA) with address correction – mail forwarded, UAA with address correction
12	UAAs, Forwarding Order Expired, Moved out of U.S.
13	Default
14	Blank form

Multiple follow-up mailings included paper questionnaires, so it was also possible that respondents received and returned more than one questionnaire. In these cases, one return was selected to represent that case in the data file. The paper/paper unduplication hierarchy is detailed in Table 12.

Table 12. Unduplication Criteria for Two Paper Returns

Order Chosen	Type of Return
1	Completed paper screener/topical - Household with children
2	Completed paper screener - Household w/o children

Order Chosen	Type of Return
3	Out of scope paper return
4	Refusal paper return, Hard Refusal
5	Incomplete, Duplicate
6	Blank, Soft Refusal
7	Deceased
8	UAA with address correction – mail forwarded, UAA with address correction
9	UAAs, Forwarding Order Expired, Moved out of U.S.
10	Default
11	Blank form

Paper to Web Standardization

Responses were standardized across web and paper so they could be appended in a single data file. Although the majority of the survey questions had the same valid values for the paper and web instruments, sometimes the values output for the paper questionnaire did not match the output from the web survey instrument. For instance, any questions that included a list of checkboxes where the respondent was instructed to "mark (X) ONE box" differed between paper and web. The difference in output between the two modes was due to the fact that the web had the ability to prevent the selection of more than one checkbox via a radio button, whereas a paper respondent could mark more than one box even if the question explicitly said not to. Since all data from the paper instruments is captured for processing, each of the response option checkboxes have their own associated output variable. Therefore, prior to appending web and paper responses into a single data file, paper responses were reformatted to the proper valid values.

Data Edits

The 2019 NSCH raw output was processed to manage inconsistent and invalid responses in nine sequential steps:

- *Stop Process Edit*. A case is removed from the data file if the case fails address verification (the respondent indicates that their address does not match the address on file), the respondent indicates that there are no children in the household, or the respondent does not complete a screener for a household with children. The cases are not eligible to be included on a NSCH data file, so are removed from processing.

- *Not in Universe Edit*. An item is not in universe if it is not included in the instrument the respondent received. Some items are unique to web or paper, and others are specific to a version of the topical instrument, T1, T2, or T3. The value for an item that is not in universe is set to '.N'.

- *Range Edit.* If a value falls outside the bounds of a defined minimum and maximum for that item, the value is replaced with an indicator that the response is missing. The minimum and maximum are selected to represent a reasonable range of possible responses to the item.

- *Backfill Edit.* The backfill edit imputes values to some items based on responses to subsequent items that necessarily indicate the correct response to the edited item. Backfill edits apply almost exclusively to paper questionnaires, which cannot prevent a respondent from skipping a root item but answering follow-up questions. For example, INCWAGES is a binary item that filters respondents on whether the family did (INCWAGES=1) or did not (INCWAGES=2) receive wage or salary income. If a respondent does not answer INCWAGES, but provides a valid and non-zero value for INCWAGES_AMT, the dollar amount of wage and salary income, then it is necessarily correct that INCWAGES=1.

- *Yes/No Edit.* The NSCH includes several series that ask respondents to select all applicable items from a list. These series may or may not allow the respondent to answer in the negative, indicating that the item is not applicable. In most cases, if a respondent answers in the affirmative (=1) to at least one item in the series, it is assumed that all other items in the series do not apply (=2) unless otherwise noted. If a respondent is only able to respond in the affirmative, and the items in the series are not comprehensive (e.g., they do not include an "Other" option), then it is assumed that all unanswered items do not apply (=2) without imposing the requirement that at least one item is answered in the affirmative.

- *Consistency Edit.* If responses to two items in the survey are fundamentally inconsistent, one response is maintained and the other is removed and changed to missing. Most consistency edits require that a child does not experience a life event at an age greater than her current age. Because the instrument generally trends from more general, fundamental information to more specific, priority is given to the item that appears first in the instrument.

- *Legitimate Skip Edit.* Unlike the 'Not in Universe Edit', the legitimate skip edit applies to items that are on the respondent's instrument, but not on path. The value for an item that is in universe but not on path is set to '.L'.

- *Missing in Error Edit.* If an item is in universe (does not equal .N), is on path (does not equal .L), but does not hold a valid value, that item is missing in error, identified as '.M'.

- *Disclosure Edit.* Some survey responses, if published, could compromise a respondent's confidentiality. Disclosure edits involve removing entire items (e.g., child's name) or suppressing rare or unique values (e.g., top codes on the family poverty ratio). Census disclosure avoidance standards make reference to weighted and unweighted cell counts (i.e., the number of children with a characteristic or set of characteristics), the size of the underlying population (e.g., the number of children in Kentucky Metropolitan Statistical Areas), and the existence of outside

data sources that could be matched to the NSCH (e.g., a registry of children diagnosed with Cerebral Palsy).

Edits were applied in two stages. In the first stage, edits for screener items were applied to completed screeners with children. When these edits were completed, cases that did not return a completed topical were removed from edits, and the second stage edits to topical items were applied.

Recoded and Standardized Variables

Standardized Variables

Several questions in the 2019 NSCH allowed respondents to provide an answer using more than one unit (e.g., years and months) and to choose from two systems of units (e.g., imperial or metric). In these cases, we provide standardized variables that convert responses across units and systems to a single unit. See Table 13 for a list and description of these variables.

Table 13. List of Standardized Variables

Variable	Description	Units
BIRTHWT_OZ_S	Child birth weight	Ounces
BREASTFEDEND_DAY_S	Stopped breastfeeding	Days
BREASTFEDEND_WK_S	Stopped breastfeeding	Weeks
BREASTFEDEND_MO_S	Stopped breastfeeding	Months
FRSTFORMULA_DAY_S	First fed formula	Days
FRSTFORMULA_WK_S	First fed formula	Weeks
FRSTFORMULA_MO_S	First fed formula	Months
FRSTSOLIDS_DAY_S	First fed solids	Days
FRSTSOLIDS_WK_S	First fed solids	Weeks
FRSTSOLIDS_MO_S	First fed solids	Months

Derived and Recoded Variables

A number of variables on the public use data files are derived from a set of items on the survey or a recoded version of a single item. These variables are listed in Table 14.

Table 14. List of Derived and Recoded Variables

Variable	Description	Derived from
AGEPOS4	Birth position of the selected child relative to other children in household	C_AGE_YEARS C_AGE_MONTHS
TOTMALE	Count of male children in household	C_SEX
TOTFEMALE	Count of female children in household	C_SEX
C_CSHCN	Special Health Care Needs (SHCN) status	C_K2Q10 - C_K2Q23

Variable	Description	Derived from
SC_CSHCN	SHCN status of selected child	C_CSHCN
TOTCSHCN	Count of children with SHCN	CSHCN
TOTNONSHCN	Count of children that do not have SHCN	C_K2Q10 - C_K2Q23
TOTAGE_0_5	Count of children 0 to 5 years old in household	C_AGE_YEARS
TOTAGE_6_11	Count of children 6 to 11 years old in household	C_AGE_YEARS
TOTAGE_12_17	Count of children 12 to 17 years old in household	C_AGE_YEARS
SC_AGE_LT4	Age of selected child (less than 4 months)	SC_AGE_YEARS SC_AGE_MONTHS
SC_AGE_LT6	Age of selected child (less than 6 months)	SC_AGE_YEARS SC_AGE_MONTHS
SC_AGE_LT9	Age of selected child (less than 9 months)	SC_AGE_YEARS SC_AGE_MONTHS
SC_AGE_LT10	Age of selected child (less than 10 months)	SC_AGE_YEARS SC_AGE_MONTHS
C_RACER	Race of child	C_RACE_R
C_RACEASIA	Asian race category is included for the following states: CA, HI, MA, MD, MN, NJ, NV, NY, VA, WA	C_RACE_R
C_RACEAIAN	American Indian/Alaska Native race category is included for the following states: AK, AZ, NM, MT, ND, OK, SD	C_RACE_R
C_HISPANIC_R	Hispanic origin	C_HISPANIC
SC_RACER	Race of selected child	SC_RACE_R
SC_RACEASIA	Asian race category is included for the following states: CA, HI, MA, MD, MN, NJ, NV, NY, VA, WA (Selected Child)	SC_RACE_R
SC_RACEAIAN	American Indian/Alaska Native race category is included for the following states: AK, AZ, NM, MT, ND, OK, SD (Selected Child)	SC_RACE_R
SC_HISPANIC_R	Hispanic origin of selected child	SC_HISPANIC
HOUSE_GEN	Parental nativity	BORNUSA A1_RELATION A1_BORN A2_RELATION A2_BORN

Variable	Description	Derived from
FAMILY_R	Family structure	A1_RELATION A2_RELATION A1_MARITAL A2_MARITAL A1_SEX A2_SEX
CURRINS	Current health insurance coverage status	K3Q04_R CURRCOV K12Q03, K12Q04, K12Q12, TRICARE, HCCOVOTH, K11Q03R
INSTYPE	Type of insurance	CURRINS K12Q03, K12Q04, K12Q12, TRICARE, HCCOVOTH, K11Q03R
INSGAP	Health insurance coverage over the past 12 months	K3Q04_R, CURRINS
FPL_I1-FPL_I6	Family poverty ratio	FAMCOUNT TOTINCOME
HIGRADE	Highest level of education for reported adults (three categories)	A1_GRADE A2_GRADE
HIGRADE_TVIS	Highest level of education for reported adults (four categories)	A1_GRADE A2_GRADE
BIRTHWT	Birth weight status	BIRTHWT_OZ_S
BIRTHWT_L	Low birth weight (<2500g)	BIRTHWT_OZ_S
BIRTHWT_VL	Very low birth weight (<1500g)	BIRTHWT_OZ_S
BMICLASS	Body Mass Index	WEIGHT_* HEIGHT_*

Specifications of Select Derived Variables

The 2019 NSCH reports several derived variables that include information on the child's family status. This includes Family Poverty Ratio (FPL), Household Nativity (HOUSE_GEN), and Family Structure (FAMILY_R).

- *Family Poverty Ratio (FPL)* - The family poverty ratio is calculated as the ratio of total family income to the family poverty threshold, and reported as a rounded percentage. Respondents reported total family income in item K4 on the paper instrument: "The following question is about your 2018 income. Think about your total combined family income IN THE LAST CALENDAR YEAR for all members of the family. What is that amount before taxes?" Additional text instructed respondents to include all money incomes, for example, social security, dividends, and child support. Responses to K4 were edited for consistency against answers in K3,

a series of questions about specific sources of income. Finally, missing or invalid responses were replaced with multiply imputed values.

The family poverty threshold is derived from the Census Bureau's poverty thresholds. Thresholds vary by family size and the number of related children under 18 years old. They do not vary across geographies. Family size was reported in K2 of the paper instrument. Missing or invalid values were imputed. The number of related children was determined by the number of children reported in the screener.

To protect the confidentiality of respondents, only FPL is reported in the Public Use File; total family income and the family poverty threshold are not included. Further, FPL is top and bottom coded. Reported values range from 50 (total family income is 50% of the family poverty threshold) to 400 (total family income is 400% of the family poverty threshold). Values beyond this range are reported as 50 or 400, respectively.

- *Household Nativity (HOUSE_GEN)* - Household nativity is determined by the birth location of the child (BORNUSA) and parents (A1_BORN and A2_BORN). If the child was born outside of the U.S. and all reported parents were born outside of the U.S., the household is reported as a 1st generation household. Second generation households have members born both inside and outside of the U.S. For example, the child was born in the U.S. and at least one parent was born outside of the U.S., or the child was born outside of the U.S. and one of two parents was born in the U.S. Finally, in 3rd+ generation households, all parents were born in the U.S. The fourth category, "Other", captures households with insufficient information about the nativity of the parents.

- *Family Structure (FAMILY_R)* - A family structure variable uses the reported information on the child's primary caregivers to organize households into common types. Notably, the NSCH collects information on only two adults in the household and requires only that the two adults be primary caregivers of the child. As a result, in multigenerational households, this can mean that a biological, adoptive, or step parent is not reported.

  Further, respondents do not report their relationship to other adult members of the household, only to the child; consequently, we may know that the two reported adults are married, but we do not know if they are married to each other. Instead of making assumptions about the relationship of the reported adults with each other, the family structure variable depends only on the number of adults, their relationship to the child, and their individual marital statuses. For example, a reported value of 1 for FAMILY means that the two reported adults are biological/adoptive parents of the child and they are currently married; one may assume that they are married to each other, but in some cases that will not be true.

  Two family structure categories (FAMILY_R=5 and 6) are also defined by the sex of the respondent. In these cases, it is specified that the responding caregiver is female (5) or male (6) and that no other parents (biological, adoptive, or step) are in the household.

The 2019 NSCH reports several variables that include information on the child's health insurance status and insurance type. We strongly recommend that data users interested in current health insurance status and insurance type use the derived variables CURRINS (Currently Insured), INSGAP (Gaps in Coverage), and INSTYPE (Insurance Type) in their analyses.

- *Currently Covered (CURRINS)* - CURRINS is derived primarily from the respondent-reported values in K3Q04_R (Health Insurance Coverage – Past 12 Months) and CURRCOV (Health Insurance Coverage – Currently Covered). We indicate that the child is currently insured (CURRINS=1) if the respondent reported that the child had coverage for all of the last 12 months (K3Q04_R=1) or reported that the child is currently covered (CURRCOV=1), but with an important caveat. If the respondent reported that the child is currently insured but reported only Indian Health Service or health care sharing ministry as the type of coverage, we indicate that the child does not have current insurance coverage (CURRINS=2). Consequently, a respondent may report that a child is insured, but we consider that the child is not insured.

- *Gaps in Coverage (INSGAP)* - INSGAP is derived primarily from the respondent reported values in K3Q04_R (Health Insurance Coverage – Past 12 Months) and CURRCOV (Health Insurance Coverage – Currently Covered). We indicate that the child had consistent coverage (INSGAP=1) if the respondent reported that the child had coverage for all of the last 12 months (K3Q04_R=1) but with an important caveat. If the respondent reported that the child is currently insured but reported only Indian Health Service or health care sharing ministry as the type of coverage, we indicate that information as to the consistency of the child's coverage is missing (INSGAP=.M).

- *Insurance Type (INSTYPE)* - INSTYPE is derived from CURRINS (Currently Insured) and respondent answers to questions on the coverage type: K12Q03 (Current/Former Employer or Union), K12Q04 (Directly Purchased), K12Q12 (Government Assistance Plan), TRICARE (TRICARE or other military health care), K11Q03 (Indian Health Service), and HCCOVOTH_WRITEIN (Other Type, Write-in). Any insurance reported as coming from an employer or union, directly purchased, TRICARE or other military health care, or the Affordable Care Act is considered private. Coverage from any government assistance plan is considered public. Both the private and public coverage categories reflect a single reported source of coverage; a combined category for children with both public and private coverage is also included.

In addition, Health Insurance write-in (HCCOVOTH_WRITEIN) responses were back-coded to flag public and private insurance types, religious health care sharing ministry, and Indian Health Service coverage. These flags were used in the derivation of CURRINS and INSTYPE. To protect respondent confidentiality, answers to HCCOVOTH_WRITEIN are not reported in the Public Use File.

Missing Values and Imputation

For most variables in the public data files, missing values are coded to identify the type of missing data. These include

- (.L) Legitimate Skip – The item is not applicable to the respondent, as determined by a previous answer to a root question.
- (.M) Missing in Error – The value is missing due to respondent or system errors, or the respondent did not provide a valid answer.
- (.N) Not in Universe – The item was not included on the respondent's age-appropriate version of the topical questionnaire.
- (.D) Suppressed for Confidentiality – The value is suppressed in order to protect respondent confidentiality.

However, variables use for raking during weighting procedures require imputation. Table 15 lists the 2019 variables that are imputed and includes the imputation flag variables to indicate records with imputed values. Tenure, sex, race, and Hispanic origin were imputed using hot-deck imputation. Adult 1 education, household size, and poverty ratio were imputed using sequential regression imputation methods.[22]

Table 155. List of Imputed Variables and their Imputation Flags

Variable	Public Use File	Variable Missing Rates	Imputation Flag Variable
Household tenure (TENURE)	Screener	0.63%	Flag for Household Tenure (TENURE_IF)
Child's sex (C_SEX)	Screener	0.19%	Flag for child's sex (C_SEX_IF)
Child's race (C_RACE_R)	Screener	0.96%	Flag for child's race (C_RACE_R_IF)
Child's Hispanic origin (C_HISPANIC_R)	Screener	0.83%	Flag for child's Hispanic origin (C_HISPANIC_R_IF)
Selected child's sex (SC_SEX)	Topical	0.14%	Flag for selected child's sex (SC_SEX_IF)
Selected child's race (SC_RACE_R)	Topical	0.68%	Flag for selected child's race (SC_RACE_R_IF)
Selected child's Hispanic origin (SC_HISPANIC_R)	Topical	0.57%	Flag for selected child's Hispanic origin (SC_HISPANIC_R_IF)
Adult 1's highest completed year of school (A1_GRADE)	Topical	2.40%	Flag for adult 1's highest completed year of school (A1_GRADE_IF)

[22] For more information on data analysis using imputed values, see https://www2.census.gov/programs-surveys/nsch/technical-documentation/methodology/NSCH-Analysis-with-Imputed-Data-Guide.pdf

Household size (HHCOUNT)	Topical	2.48%	Flag for household size (HHCOUNT_IF)
Family poverty ratio (FPL)	Topical	17.60%	Flag for family poverty ratio (FPL_IF)

Multiple Imputation

Using sequential regression imputation methods, FPL is multiply imputed and contains six versions or implicates. The public use file includes all six imputed values for FPL [FPL_I1-FPL_I6]. The primary motivation for the multiple imputation is to allow interested researchers to appropriately account for uncertainty in estimates using FPL that is hidden when using a single implicate.[23] FPL input includes imputed values for family income (not included in the public use file) and number of people that are family members (FAMCOUNT). An estimated family count (FAMCOUNT) was derived from HHCOUNT and other household information when FAMCOUNT was not reported by the household. The imputation was executed by sequential regression modeling imputation[24] using IVEWare.[25]

Suppressed Variables

A number of variables had range caps or suppressed values to protect respondent confidentiality consistent with U.S. Census Bureau protocols. For example, a reported value must represent at least 10,000 children (weighted estimate). These variables are listed in Table 16.

Table 166. List of Suppressed Variables

Variable	Description	Valid Values
TOTKIDS_R	Number of children living in the household	1 = 1 2 = 2 3 = 3 4 = 4+
MOMAGE	Age of mother when child was born	18 = 18 years or younger 45 = 45 years or older
K2Q35A_1_YEARS	Age of child when first diagnosed with autism	1 = 1 year or younger 15 = 15 years or older
BIRTHWT_OZ_S	Birth weight	72 = 72 oz. or less 155 = 155 oz. or more
K11Q43R	Number of time the child has moved to a new address	13 = 13 or 14 times 15 = 15 or more times
A1_AGE	Age of Adult 1	75 = 75 years or older

[23] Schaefer JL, Graham JW. 2002. "Missing Data: Our View of State of the Art". *Psychological Methods,* 7(2): 147-77.
[24] Raghunathan TE, Lepkowski JM, Hoewyk JV, Solenberger PW. 2001. "A Multivariate Technique for Multiply Imputing Missing Values using a Sequence of Regression Models". *Survey Methodology,* 27: 85–95.
[25] Raghunathan TE, Solenberger PW, Hoewyk JV. 2016. IVEware: Imputation and Variance Estimation Software User's Guide (Version 0.3). Ann Arbor, MI: Institute for Social Research, University of Michigan.

Variable	Description	Valid Values
A2_AGE	Age of Adult 2	75 = 75 years or older
A1_LIVEUSA	When Adult 1 came to live in the U.S.	1970 = Before or in 1970
A2_LIVEUSA	When Adult 2 came to live in the U.S.	1970 = Before or in 1970
BREASTFEDEND_DAY_S	Stopped breastfeeding, age in days	Suppressed if > 5
BREASTFEDEND_WK_S	Stopped breastfeeding, age in weeks	Suppressed if > 8
BREASTFEDEND_MO_S	Stopped breastfeeding, age in months	29 = 29 or more
FRSTFORMULA_DAY_S	First fed formula, age in days	Suppressed if > 6
FRSTFORMULA_WK_S	First fed formula, age in weeks	Suppressed if > 9
FRSTFORMULA_MO_S	First fed formula, age in months	12 = 12 or more
FRSTSOLIDS_DAY_S	First fed solids, age in days	Suppressed if > 1
FRSTSOLIDS_WK_S	First fed solids, age in weeks	Suppressed if > 4
FRSTSOLIDS_MO_S	First fed solids, age in months	15 = 15 or more
FPL	Family poverty ratio	50 = 50% or less 400 = 400% or more
FAMCOUNT	Family Count	8 = 8 or more
HHCOUNT	Household Count	10 = 10 or more
K4Q37	Received Special Services - Age in Years	15 = 15 or more
SESPLANYR	Special Education Plan - Age in Years	16 = 16 or more

Geography Variables

The 2019 NSCH includes four geography variables on the Public Use File

- FIPSST (State of Residence)
- CBSAFP_YN (Core-Based Statistical Area Status)
- METRO_YN (Metropolitan Statistical Area Status)
- MPC_YN (Metropolitan Principal City Status)

Table 17 provides a general description of the geography variables and their valid values. To protect respondent confidentiality, CBSAFP_YN, METRO_YN, and MPC_YN are not reported in some states. If a variable or intersection of variables could be used to identify a geographic area within a state with a child population under 100,000, reported values for that variable were replaced with ".D", indicating "Suppressed for Confidentiality".

Table 177. List of Geography Variables

Variable	Description	Valid Values
FIPSST	State of Residence	[FIPS code]
CBSAFP_YN	Core Based Statistical Area (CBSA): County or counties associated with at least one core (urbanized area or urban cluster) of at least 10,000 population, plus adjacent counties having a high degree of social and economic integration with the core as measured through commuting ties.	.D = Suppressed for confidentiality 1 = In a CBSA 2 = Not in a CBSA
METRO_YN	Metropolitan Statistical Area (MSA): County or counties associated with at least one urbanized area of at least 50,000 population, plus adjacent counties having a high degree of social and economic integration with the core as measured through commuting ties.	.D = Suppressed for confidentiality 1 = In a MSA 2 = Not in a MSA
MPC_YN	Metropolitan Principal City: An incorporated place or census designated place in a Metropolitan Statistical Area that meets specific population and workforce requirements.	.D = Suppressed for confidentiality 1 = In a Metropolitan Principal City 2 = Not in a Metropolitan Principal City

Additional geographies are identified through the intersection of CBSAFP_YN, METRO_YN, and MPC_YN shown in Table 18.

Table 188. Geographies Identified at the Intersections

Intersection	Additional Geography Level
CBSAFP_YN =1 and METRO_YN =2	Micropolitan Statistical Area: County or counties (or equivalent entities) associated with at least one urban cluster of at least 10,000 but less than 50,000 population, plus adjacent counties having a high degree of social and economic integration with the core as measured through commuting ties
METRO_YN =1 and MPC_YN=2	In an MSA, but not a Metropolitan Principal City: County or counties associated with at least one urbanized area of at least 50,000 population, plus adjacent counties having a high degree of social and economic integration with the core as measured through commuting ties, but is not incorporated place or census designated place within the Metropolitan Statistical Area.

Alternative and lower level geographic identifiers are not included with the public use data file. Access to these variables is restricted to the Federal Statistical Research Data Centers (RDCs). Researchers can apply for RDC access; proposed projects must demonstrate scientific merit, require non-public data, be feasible, pose no risk to respondent confidentiality, and provide benefit to Census Bureau programs. The

currently open RDCs are listed at https://www.census.gov/about/adrm/fsrdc/locations.html, and additional information on the RDC application process is available at https://www.census.gov/programs-surveys/ces/data/restricted-use-data/apply-for-access.html.

Weighting Specifications

Overview

The 2019 NSCH uses case- and household-level weights for population-based estimates. These include

- Household Weight-Screener (FWH)
- Child Weight-Screener (FWS)
- Selected Child Weight-Topical (FWC)

Each weight is the product of the base sampling weight, nonresponse adjustment factors, and raking to population controls. The Selected Child Weight also includes a subsampling adjustment. Population controls are derived from the 2018 American Community Survey (ACS).

Base Sampling Weights

The weighting process began with the base sampling weight for each sample household. The base weight (i.e., sampling interval) for each sample housing unit was the inverse of its probability of selection for the screener. Base weights were calculated separately for each of the two strata and each state, including the District of Columbia. If there had been no nonresponse and the survey frame was complete, using this weight would give unbiased estimates for the survey population.

Adjustment for Screener Nonresponse

Following the base weight, an adjustment for screener nonresponse was implemented to increase the weights of the households that responded to the screener in order to account for all of the households that did not respond to the screener. Households were put into one of sixteen cells defined by stratum, a block group poverty measure variable (yes or no) indicating the proportion of households with income less than 150% of the federal poverty level, web group (High Paper or High Web), and Metropolitan Statistical Area Status. The screener nonresponse adjustment factor was calculated within each cell using the following formula:

$$\left(\frac{\text{weighted sum of screener interviews} + \text{weighted number of screener non-interviews}}{\text{weighted sum of screener interviews}}\right)$$

where the number of screener non-interviews =

$$\left(\frac{\text{weighted sum of screener interviews}}{\text{weighted sum of screener interviews} + \text{weighted sum of screener ineligible households}}\right)$$

$$\times$$

$$(\text{weighted sum of households with unknown screener eligibility})$$

In other words, the count of screener non-interviews was an estimate of the expected number of eligible households from those cases for which nothing was returned. The term “eligible” here refers to the address belonging to an occupied, residential household. The expected number of eligible cases was estimated by taking the eligibility rate among the known cases and applying it to the unknown cases.

The screener nonresponse adjustment was the last step of the weight processing that included the households for which there was no screener interview and the screener-interviewed households that indicated no eligible children.

Adjustment to Population Controls at the Household Level

All households with children that completed a screener were given a household-level weight. In addition to the base weight and screener nonresponse adjustment, a household post-stratification adjustment was applied in order to achieve the final household screener weight. This factor consisted of ratio adjustments to population controls at the household level obtained from the 2018 ACS data. Households were put into one of 255 cells defined by state, race of the child selected for the topical, and Hispanic origin (yes or no) of the selected child if the selected child's race was White. Within each cell, the household post-stratification adjustment was calculated as the ACS population count for the cell divided by the cell's weighted total. The product of the base weight, screener nonresponse adjustment, and this household post-stratification adjustment constituted the final household screener weight.

First Raking to Population Controls: All Screener Children

All eligible children (four at most) from completed screener interviews were given a child-level screener weight. The weights of children from completed screener interviews were adjusted to match the 2018 ACS estimates for the following characteristics:

- Dimension #1 – State by Child's Race (White alone, Black alone, Asian alone, Other)
- Dimension #2 – State by Child's Ethnicity (Hispanic, Non-Hispanic)
- Dimension #3 – State by Child's Sex by Child's Age Group (0-5, 6-11, 12-17 years)

Each iteration of this process consisted of calculating three ratio adjustments, one for each dimension, sequentially. The adjustment factor calculated for Dimension 1 was applied to the weights accordingly and this newly adjusted weight went into the calculation of the adjustment factor for Dimension 2. This iterative raking process continued until the difference between the sum of the weights and the control total associated with each cell was less than 1% of the control. The resulting weight from this process was the final child-level screener weight for each eligible child. Only the children selected for the topical continued in the weighting process to eventually receive a final interviewed child weight.

Adjustment for Households with More than One Child

In households with multiple children, the selected child represented all eligible children in their household. Thus, a within-household subsampling factor was applied to account for the selection of a single child, as well as the oversampling for young children and children with special health care needs (CSHCN). The value of this adjustment was the inverse of the probability of selection for the selected child. Probabilities varied by the number of children in the household, the presence of children aged 0-5, and the presence of CSHCN.

Adjustment for Topical Nonresponse

Similar to the screener nonresponse adjustment, the weights of the households responding to the topical needed to be increased to account for all of the households not responding to the topical. The

adjustment considered all topical interviews (complete and sufficient partial) defined by questionnaires with valid answers for at least 25 of 50 test questions, and at least one item in Section H or beyond or the respondent submitted the topical portion of the web instrument. Returned topical that did not meet the criteria were considered a topical non-interview.

All topical-eligible households were put into one of sixteen cells depending on imputed poverty/non-poverty status, web group (High Paper vs. High Web), tenure (owner occupied or not), and presence of CSHCN. The topical nonresponse adjustment was calculated within each of the sixteen cells as:

$$\left(\frac{\text{weighted sum of topical interviews } + \text{ weighted sum of topical non-interviews}}{\text{weighted sum of topical interviews}}\right)$$

After this adjustment, the selected children from topical non-interview households were no longer involved in the weighting process and only interviewed children continued to the last steps.

Second Raking to Population Controls: Topical Interviewed Children

The final step of the weighting was accomplished through a second iterative raking process to ACS population controls. The process was equivalent to that of the child-level screener weight, with the exception of additional and different dimensions as well as a trimming step. The following eight analytical domains of interest were used:

- Dimension #1 – State by Family Poverty Ratio (≤100%, 101-200%, >200%)
- Dimension #2 – State by Household Size (≤3, 4, >4)
- Dimension #3 – State Groupings by Respondent's Education (<High School, High School, >High School)
- Dimension #4 – State by Selected Child's Race (White, Black, Asian, Other)
- Dimension #5 – State by Selected Child's Ethnicity (Hispanic, Non-Hispanic)
- Dimension #6 – State by Selected Child's Special Health Care Needs Status
- Dimension #7 – Selected Child's Race by Ethnicity (at the national level)
- Dimension #8 – Selected Child's Sex by Single Age (at the national level)

For Dimension #3, some states needed to be grouped due to the low number of respondents in each state with less than a high school degree. States were grouped with others that had similar education distributions based on ACS data. The states were first sorted by the ACS-derived percent of children in households where the respondent has less than a high school degree, followed by an additional sort by the percent of children in households where the respondent has a high school degree. State groupings were made with the intent of keeping these distributions similar within each group. The result was 16 state groupings and 8 stand-alone states. The following were the resulting groupings:

- Group 1: Maine, New Hampshire, North Dakota, and Vermont
- Group 2: Minnesota, Utah, and Virginia
- Group 3: Hawaii, Iowa, Montana, and Wyoming
- Group 4: Massachusetts and Colorado

- Group 5: Connecticut, Nebraska, New Jersey, and South Dakota
- Group 6: DC and Maryland
- Group 7: Illinois, Oregon, and Rhode Island
- Group 8: Michigan, Ohio, and Wisconsin
- Group 9: Idaho, Kansas, and Washington
- Group 10: Missouri and South Carolina
- Group 11: Delaware, Kentucky, and Pennsylvania
- Group 12: Alaska and West Virginia
- Group 13: New York and North Carolina
- Group 14: Alabama and Florida
- Group 15: Arkansas and Louisiana
- Group 16: Arizona and Texas
- Stand-alone states: California, Georgia, Indiana, Mississippi, Nevada, New Mexico, Oklahoma, and Tennessee

Trimming of Large Weights

The resulting weights from each iteration of the raking process were checked for extreme values in order to prevent a small number of cases with large weights from having undue influence on estimates and increasing the variance. An extreme value was determined to be a weight that exceeded the median weight plus six times the interquartile range (IQR) of the weights in each state. These extreme weights were truncated to this cutoff (median plus six times the IQR of weights in that state) and the weights were checked for convergence to the controls. Convergence required the weighted total of each cell to be within 1% of the control for the cell. If convergence was not met for every cell, another iteration of the raking process was applied again. This process of raking and trimming was reiterated until convergence was met and there were few extreme weights left. In general, the remaining extreme weights were observed to be very close to the cutoff. The remaining extreme weights were truncated a final time to the median plus six times the IQR in the state and the process was complete.

Population Controls

Population controls used throughout the weighting were derived from the 2018 ACS one-year estimates. By using the 2018 ACS data, the weighted totals were ensured to match the most up-to-date population control totals available for key demographic variables for children and households in the U.S. The controls were used in the household post-stratification adjustment, the raking to attain the child-level screener weights, and the raking to attain the final topical interviewed children weights. Almost all controls used were at the state level, with the exception of the last two dimensions where national-level controls were used in the second raking process.

For the household post-stratification adjustment, the NSCH household weights were adjusted so that the sum of the weights equaled the 2018 ACS estimates for the number of households in each state by race (White, Black, Asian, Other) and by Hispanic origin (yes or no) if the selected child's race was White. In the first raking process, up to four children from each screener received adjustments so that the sum

of the weights of all children listed on screeners equaled the ACS estimates for the number of children in each state by race, state by Hispanic origin, and state by sex by age group (0-5, 6-11, 12-17 years). Finally, in the second raking process, the weights of the NSCH topical interviewed children were adjusted so that the sum of their weights equaled the ACS estimates for each state by family poverty ratio (≤100%, 101-200%, >200%), household size (≤3, 4, >4), respondent's highest level of education (<High School, High School, >High School), race, Hispanic origin, and special health care needs status, as well as race by ethnicity and sex by age in years at the national level.

Limitations

In order to minimize the variability of the weights caused by large adjustment factors, cells having fewer than 30 cases were collapsed with a neighboring cell. The adjustment factors were then calculated for the merged cells by combining the population controls and the sample cases for the two cells. Since the individual cells were combined, and only one adjustment factor was created per cell, only the weighted total for the *combined* cell will match the control following the raking procedure. Consequently, the weighted totals for the individual cells will most likely not match the population controls for the original individual cells. As shown in Table 19, cells were collapsed in two of the dimensions in the last raking step.

Table 19. Collapsed Dimensions of Final Raking and Affected States

Collapse	Dimension Collapsed	Affected States
Black collapsed with Other in 26 states	Dimension #4 - State by Selected Child's Race (White, Black, Asian, Other)	AK, AZ, CA, CO, CT, HI, ID, IA, KS, ME, MA, MN, MT, NE, NH, NM, ND, OK, OR, SD, UT, VT, WA, WV, WI, WY
Asian collapsed with Other in 35 states	Dimension #4 - State by Selected Child's Race (White, Black, Asian, Other)	AL, AZ, AR, CO, DC, FL, ID, IN, IA, KS, KY, LA, ME, MI, MS, MO, MT, NE, NH, NM, NC, ND, OH, OK, OR, PA, RI, SC, SD, TN, UT, VT, WV, WI, WY
Hispanic and Non-Hispanic collapsed in 10 states	Dimension #5 - State by Selected Child's Ethnicity (Hispanic, Non-Hispanic)	AL, KY, ME, MI, MS, MO, ND, SD, VT, WV

Estimation, Hypothesis Testing, and Data Use Guidelines

Variance Estimation

When survey weights are used, the resulting estimates from the 2019 NSCH are representative of all non-institutionalized children aged 0 to 17 years in the U.S. and in each state and the District of Columbia who live in housing units. These weighted estimates do not generalize to the population of parents, mothers, or pediatric health care providers. Analysts are advised to avoid statements such as "the percent of parents".

Two stratum identifiers should be used to estimate variance: FIPSST (state of residence) and STRATUM (identifies households flagged with children). Each record in the data file is assigned a unique household identifier, HHID. Some analysts may be using statistical programs that only permit the specification of a single stratum variable. These users should define a new variable with 102 levels by crossing STRATUM (2 levels) with FIPSST (51 levels). This new variable can then be used as the stratum variable. For example, Stata users can specify only one variable in the strata() option of svyset. This new variable (named here as STRATACROSS) can be created using the following statement:

- EGEN STRATACROSS = GROUP (FIPSST STRATUM)

SUDAAN users can identify both FIPSST and STRATUM in the NEST statement. However, SUDAAN users should note that the first variable listed after the word NEST is assumed to be the stratum variable, and the second variable listed is assumed to be the PSU. To properly identify the PSU variable, the PSULEV option must be invoked in the NEST statement as shown here:

- NEST FIPSST STRATUM HHID / PSULEV = 3;

In both individual year and multi-year analyses, the NSCH sample size may be limited for smaller populations (e.g., American Indian or Alaska Native) and state-level subgroups or rare outcomes (e.g., adolescent CSHCN or autism in a particular state). Small sample sizes may produce unstable estimates. To minimize misinterpretation, we recommend only presenting statistics with a sample size or unweighted denominator of 30 or more. Further, if the 95% confidence interval width exceeds 20 percentage points or 1.2 times the estimate (≈ relative standard error >30%), we recommend flagging for poor reliability and/or presenting a measure of statistical reliability (e.g., confidence intervals or statistical significance testing) to promote appropriate interpretation.

State-level estimates may be compared to national estimates using a nested z-test to identify significant differences at a given alpha or Type 1 error level (e.g., 0.05, 0.01). The formula for this is as follows:

$$Z = \frac{\bar{X}_i - \bar{X}_j}{\sqrt{SE_i^2 + SE_j^2 - 2P * SE_j^2}}$$

Where j is a subset of i (e.g., Alabama as part of the Total US), $\bar{X}$ is the mean or proportion, SE is the standard error, and P is the proportion of the weighted denominator for a given indicator that is specific to j (e.g., Alabama weighted denominator divided by the Total US weighted denominator). A simple independent Z-test would be a more conservative test that may increase Type II error—the probability of failing to reject the null of no difference when there is a difference.

Combining Data across Survey Years

Data across multiple years of the redesigned NSCH (2016 and later) can be combined to increase the analytic sample size. By leveraging a larger sample, data users can analyze smaller population groups and rare outcomes that are not sufficiently represented in a single year sample and produce national and state-level estimates with smaller standard errors. Guidance for producing multi-year estimates is available at https://www2.census.gov/programs-surveys/nsch/technical-documentation/methodology/NSCH-Guide-to-Multi-Year-Estimates.pdf.

Confidentiality

Participation in the 2019 NSCH was voluntary, and all data collected that could potentially identify an individual person are confidential. Data are kept private in accordance with applicable law. Respondents are assured of the confidentiality of their replies in accordance with 13 U.S.C. Section 9. All access to Title 13 data from this survey is restricted to Census Bureau employees and those holding Census Bureau Special Sworn Status pursuant to 13 U.S.C. Section 23(c). In compliance with this law, all data released to the public are only in a statistical format. No information that could personally identify a respondent or household may be released. The Screener and Topical public use data files went through a thorough disclosure review process and were approved by the Census Disclosure Review Board prior to release.

Guidelines for Data Use

The U.S. Census Bureau is conducting the NSCH on the behalf of the Health Resources and Services Administration's Maternal and Child Health Bureau (HRSA MCHB) within the U.S. Department of Health and Human Services (HHS) under Title 13, United States Code, Section 8(b), which allows the Census Bureau to conduct surveys on behalf of other agencies. Title 42 U.S.C. Section 701(a)(2) allows HHS to collect information for the purpose of understanding the health and well-being of children in the U.S. The data collected under this agreement are confidential under 13 U.S.C. Section 9. All access to Title 13 data from this survey is restricted to Census Bureau employees and those holding Census Bureau Special Sworn Status pursuant to 13 U.S.C. Section 23(c).

Any effort to determine the identity of any reported case is prohibited. The Census Bureau and HRSA MCHB take extraordinary measures to assure that the identity of survey subjects cannot be disclosed. All direct identifiers, as well as characteristics that might lead to identification, have been omitted from the data set. Any intentional identification or disclosure of a person or establishment violates the assurances of confidentiality given to the providers of the information. Therefore, users must:

- Use the data in this data set for statistical reporting and analysis only

- Make no use of the identity of any person discovered, inadvertently or otherwise
- Not link this data set with individually identifiable data from any other Census Bureau or non-Census Bureau data sets

Use of the data set signifies users' agreement to comply with the previously stated statutory-based requirements. Before releasing any statistics to the public, the Census Bureau reviews them to make sure none of the information or characteristics could identify someone. For more information about the Census Bureau's privacy and confidentiality protections, contact the Policy Coordination Office toll-free at 1-800-923-8282.

Supporting Material

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Attachment A: Estimated State-Level Production Sample Sizes for the 2019 National Survey of Children's Health

State sample sizes by stratum were determined using the following criteria. First, the Stratum 1 oversampling rates for each state were maximized such that the variance did not far exceed that of a design that sampled equally in the two strata. Second, the target number of topical interviews per state was adjusted until the total sample size was at the desired size, which for 2019 is approximately 180,000 addresses yielding 515 topical interviews per state.

Table A-1: Address Sample Size and Strata Distribution by State

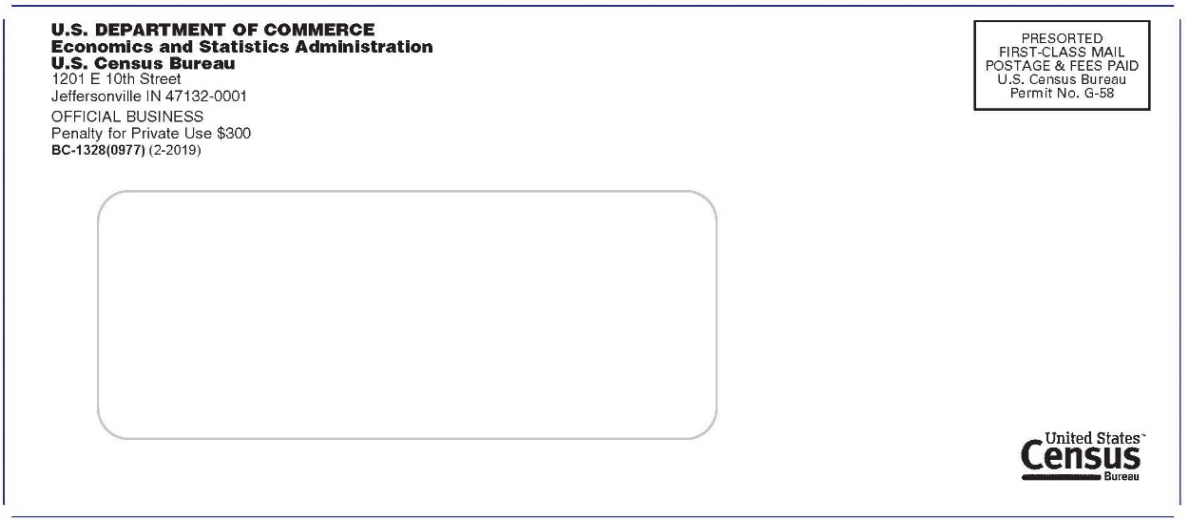
State	*Total Sample (approx.)*	*Stratum 1*	*Stratum 2A*
Alabama	4,100	61.0%	39.0%
Alaska	5,200	43.3%	56.7%
Arizona	4,200	55.9%	44.1%
Arkansas	5,100	54.2%	45.8%
California	3,300	67.5%	32.5%
Colorado	2,900	60.7%	39.3%
Connecticut	3,000	63.5%	36.5%
Delaware	3,600	63.3%	36.7%
District of Columbia	3,500	67.2%	32.8%
Florida	4,400	59.6%	40.4%
Georgia	4,300	62.0%	38.0%
Hawaii	3,800	41.8%	58.2%
Idaho	2,900	58.9%	41.1%
Illinois	3,200	60.7%	39.3%
Indiana	3,200	63.0%	37.0%
Iowa	2,700	64.6%	35.4%
Kansas	2,900	66.6%	33.4%
Kentucky	3,900	58.1%	41.9%
Louisiana	5,300	58.1%	41.9%
Maine	3,100	62.3%	37.7%
Maryland	2,800	65.8%	34.2%
Massachusetts	2,700	66.7%	33.3%
Michigan	2,600	68.1%	31.9%
Minnesota	2,000	68.9%	31.1%
Mississippi	5,200	60.1%	39.9%
Missouri	3,200	65.0%	35.0%
Montana	3,800	51.6%	48.4%
Nebraska	2,900	62.9%	37.1%
Nevada	4,100	60.4%	39.6%

New Hampshire	3,100	64.9%	35.1%
New Jersey	2,900	64.1%	35.9%
New Mexico	5,400	48.9%	51.1%
New York	3,800	57.3%	42.7%
North Carolina	3,500	65.4%	34.6%
North Dakota	3,100	60.6%	39.4%
Ohio	2,900	68.0%	32.0%
Oklahoma	4,700	55.1%	44.9%
Oregon	2,800	64.8%	35.2%
Pennsylvania	2,800	66.3%	33.7%
Rhode Island	3,400	63.9%	36.1%
South Carolina	4,000	63.4%	36.6%
South Dakota	3,200	56.9%	43.1%
Tennessee	3,400	66.0%	34.0%
Texas	4,100	63.6%	36.4%
Utah	2,200	70.2%	29.8%
Vermont	3,200	57.0%	43.0%
Virginia	2,800	64.7%	35.3%
Washington	2,900	60.4%	39.6%
West Virginia	4,900	46.9%	53.1%
Wisconsin	2,300	67.0%	33.0%
Wyoming	4,300	52.5%	47.5%

Attachment B: Traditional and Redesigned Envelope Designs

For the initial mailing, 50% of the sample received traditional envelopes and 50% received the redesigned envelopes. The redesigned envelope moved the Census logo to the upper left corner, added a red banner with white call-out text, and added icons. The two “Low Paper” envelopes were business standard size envelopes and contained a Web-push invite to the survey. The two “High Paper” initial mailing envelopes were 9"x11.5" flat mail envelopes and contained a mixed-mode invite, both a web survey invite and a paper screener questionnaire.

Traditional Low Paper Envelope



Redesigned Low Paper Envelope

Traditional High Paper Envelope

U.S. DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. Census Bureau

1201 E 10TH Street

Jeffersonville IN 47132-0001

OFFICIAL BUSINESS
Penalty for Private Use $300

BC-1776(0977B) (2-2019)

PRESORTED
FIRST-CLASS MAIL
POSTAGE & FEES PAID
U.S. CENSUS BUREAU
PERMIT NO. G-58

United States Census Bureau

Redesigned High Paper Envelope

United States Census Bureau

U.S. DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. Census Bureau
1201 E 10TH Street
Jeffersonville IN 47132-0001

OFFICIAL BUSINESS
Penalty for Private Use $300

BC-1776(0977NE) (4-2019)

PRESORTED
FIRST-CLASS MAIL
POSTAGE & FEES PAID
U.S. CENSUS BUREAU
PERMIT NO. G-58

Official Response Requested

Attachment C: Determined Household Type from the 2019 National Survey of Children's Health

Households are given a type based on the created variables from the screener responses:

- TOTKIDS_E Total number of eligible children
- CHILDY0_5 Indicator child in 0-5 years old
- CHILDN0_5 Indicator child is not 0-5 years old
- TOTCSHCN Total number of special needs children
- TOTNON Total number of not special needs children

Table B-1 shows the value for TYPE (1,2,3A,3B,4,5A,5B,5C,6,7,8) based on from the values of the five screener variables indicated in columns 2-6. Each record picks up the selected child number value of (0,1,2,3,4) from the corresponding HHTYP_1 - HHTYP_8 variable. SC_CHILD receives the value of the selected child number for that household, which is the number of the child after sorting.

Table B-1: Household Type Assignment from the Values of Five Screener Variables

Household Type	Screener Variables					
	TOTKIDS_E	**CHILDY0_5**	**CHILDN0_5**	**TOTCSHCN**	**TOTNON**	
TYPE=1 → HHTYP_1	0 or blank	n/a	n/a	n/a	n/a	No child selected
TYPE=2 → HHTYP_2	1	n/a	n/a	n/a	n/a	Only child was selected
TYPE=3A → HHTYP_3A	2	2	0	2	0	50% chance of selection
				0	2	
		0	2	2	0	
				0	2	
TYPE=3B → HHTYP_3B	2	1	1	2	0	Selected child is 0 to 5 years old probability: 62% Over 5 years: 38%
				0	2	
TYPE=4 → HHTYP_4	2	n/a	n/a	1	1	Select CSHCN probability: 64% Select Non CSHCN: 36%
TYPE=5A → HHTYP_5A	3	3	0	3	0	All three children have 33% chance of selection
				0	3	
		0	3	3	0	
				0	3	
TYPE=5B → HHTYP_5B	3	1	2	3	0	Child 0 through 5: 44% Child greater than 5: 28%
				0	3	
TYPE=5C → HHTYP_5C	3	2	1	3	0	Child 0 through 5: 38% Child greater than 5: 24%
				0	3	

Household Type	Screener Variables					
	TOTKIDS_E	**CHILDY0_5**	**CHILDN0_5**	**TOTCSHCN**	**TOTNON**	
TYPE=6 → HHTYP_6	3	n/a	n/a	1	2	Select CSHCN probability: 48% Select Non CSHCN: 26%
TYPE=7 → HHTYP_7	3	n/a	n/a	2	1	Select CSHCN probability: 39% Select Non CSHCN: 22%
TYPE=8 → HHTYP_8	≥4	n/a	n/a	n/a	n/a	All four children have 25% chance of selection

Attachment D: Weighted Response Rates by State

State	Resolution Rate	Screener Conversion Rate	Screener Completion Rate	Topical Conversion Rate	Topical Completion Rate	Interview Completion Rate	Overall Response Rate
United States	*53.4%*	*99.0%*	*47.8%*	*80.3%*	*35.3%*	*79.5%*	*42.4%*
Alabama	51.8%	98.8%	44.9%	78.6%	33.3%	77.6%	40.2%
Alaska	67.1%	99.3%	56.7%	80.5%	39.0%	79.9%	53.7%
Arizona	55.0%	98.8%	46.9%	80.1%	36.7%	79.1%	43.5%
Arkansas	55.0%	99.3%	46.9%	77.9%	33.3%	77.3%	42.5%
California	45.9%	98.7%	41.7%	77.9%	31.9%	76.9%	35.3%
Colorado	55.1%	99.3%	49.5%	81.2%	38.1%	80.6%	44.4%
Connecticut	51.3%	98.5%	47.3%	74.6%	36.6%	73.5%	37.7%
Delaware	51.2%	99.7%	46.3%	78.8%	32.8%	78.6%	40.2%
District of Columbia	51.2%	99.3%	46.8%	78.3%	37.4%	77.8%	39.9%
Florida	50.4%	98.7%	43.3%	77.4%	33.4%	76.4%	38.5%
Georgia	47.3%	99.1%	40.7%	79.2%	31.8%	78.5%	37.1%
Hawaii	60.3%	99.3%	53.5%	78.2%	38.1%	77.7%	46.8%
Idaho	63.4%	99.4%	57.3%	80.6%	43.9%	80.1%	50.7%
Illinois	52.6%	98.8%	47.7%	79.7%	37.3%	78.7%	41.4%
Indiana	55.1%	99.4%	49.3%	78.6%	37.2%	78.1%	43.0%
Iowa	64.9%	99.7%	61.9%	78.9%	40.2%	78.7%	51.1%
Kansas	57.8%	99.4%	52.1%	81.4%	39.5%	80.9%	46.7%
Kentucky	58.1%	99.8%	52.8%	77.8%	33.8%	77.7%	45.1%
Louisiana	49.0%	98.8%	40.2%	79.5%	31.0%	78.6%	38.5%
Maine	64.6%	99.8%	56.5%	76.7%	36.9%	76.5%	49.4%
Maryland	54.7%	99.0%	50.7%	78.2%	38.6%	77.5%	42.4%
Massachusetts	54.5%	98.7%	50.6%	77.9%	38.1%	76.9%	41.9%
Michigan	56.2%	99.3%	51.2%	78.2%	37.2%	77.7%	43.6%
Minnesota	63.5%	99.4%	59.5%	82.4%	45.5%	81.9%	52.0%

Mississippi	51.9%	99.4%	44.0%	74.1%	30.9%	73.6%	38.2%
Missouri	58.0%	99.6%	52.3%	81.0%	40.4%	80.7%	46.8%
Montana	68.9%	99.9%	63.1%	79.2%	42.7%	79.1%	54.5%
Nebraska	61.5%	99.4%	57.6%	80.1%	38.5%	79.6%	48.9%
Nevada	49.5%	99.3%	43.8%	78.0%	31.3%	77.4%	38.4%
New Hampshire	63.8%	99.7%	56.9%	80.3%	41.2%	80.0%	51.1%
New Jersey	50.1%	99.2%	46.6%	78.9%	35.2%	78.2%	39.2%
New Mexico	62.6%	99.5%	54.9%	78.7%	37.1%	78.3%	49.0%
New York	50.1%	98.1%	45.7%	73.5%	32.8%	72.1%	36.2%
North Carolina	53.0%	99.2%	46.3%	78.0%	34.2%	77.4%	41.0%
North Dakota	66.1%	99.6%	61.2%	77.1%	40.8%	76.8%	50.7%
Ohio	55.6%	99.5%	50.7%	74.5%	35.3%	74.2%	41.2%
Oklahoma	56.7%	99.0%	49.2%	77.8%	35.2%	77.0%	43.7%
Oregon	57.3%	99.0%	53.7%	81.7%	41.9%	80.9%	46.3%
Pennsylvania	57.8%	99.4%	52.6%	81.1%	41.7%	80.6%	46.6%
Rhode Island	50.7%	99.0%	46.4%	78.3%	33.8%	77.5%	39.3%
South Carolina	53.8%	98.7%	46.1%	74.4%	32.0%	73.5%	39.5%
South Dakota	67.0%	99.8%	62.9%	82.1%	42.7%	82.0%	54.9%
Tennessee	50.6%	99.3%	45.8%	77.4%	33.3%	76.9%	38.9%
Texas	47.5%	98.8%	40.6%	74.5%	28.4%	73.6%	35.0%
Utah	56.7%	99.0%	51.9%	82.1%	42.6%	81.3%	46.1%
Vermont	71.1%	99.8%	60.3%	81.9%	42.7%	81.7%	58.1%
Virginia	55.0%	98.7%	50.2%	81.0%	38.6%	79.9%	44.0%
Washington	59.2%	98.7%	54.3%	80.4%	41.2%	79.4%	47.0%
West Virginia	63.2%	99.7%	55.5%	78.6%	36.2%	78.3%	49.5%
Wisconsin	63.3%	99.1%	58.5%	80.3%	43.8%	79.6%	50.4%
Wyoming	66.9%	99.6%	57.1%	81.3%	40.3%	80.9%	54.1%